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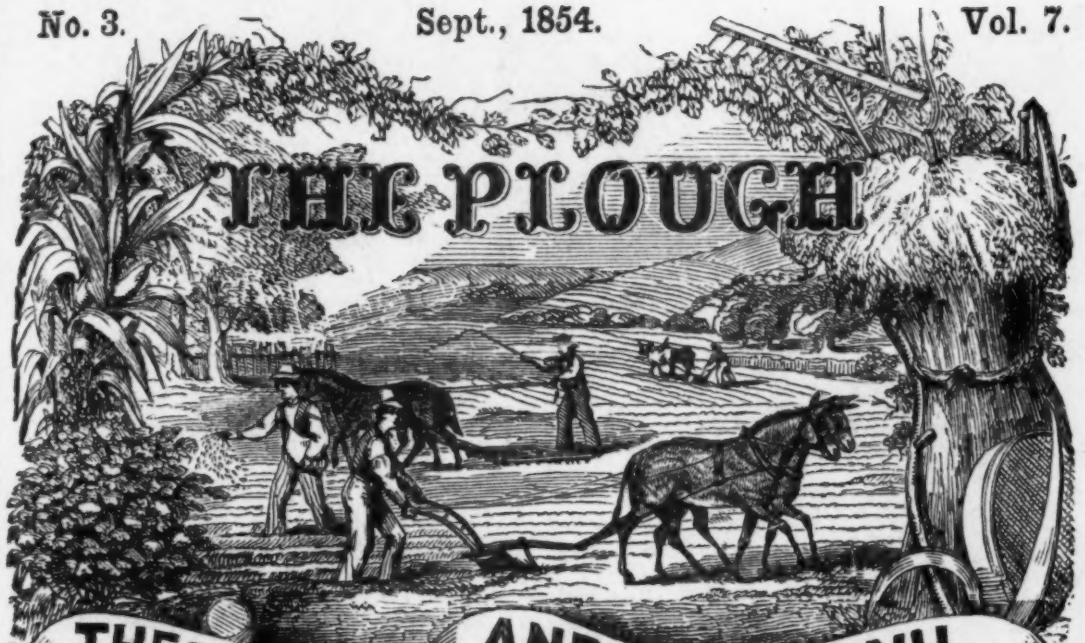
THE PLOUGH



THE LOOM AND THE ANVIL.

FARMER AND MECHANIC.

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CONTENTS OF NO. 3.—VOL. VII.

The Plough, the Loom, and the Anvil.

VOL. VII. SEPTEMBER, 1854. No. 3.

STATISTICS OF ST. LOUIS.

THIS city stands on the west bank of the Mississippi river, 18 miles below the mouth of the Missouri, and 1101 miles, by the course of the river, from New-Orleans. It was first settled in 1764. Its population in 1810 was 1600; in 1820, 4598; in 1840, 16,469; and in 1850, 82,774. It is the commercial metropolis of Missouri, and was formerly its seat of government. Its situation is excellent. It is elevated above the river, the ascent being rather abrupt to the first plane, about twenty feet above the highest water, and rises thence more gradually to a second plane, forty feet above the first. The higher plane extends toward the west as far as the eye can reach.

As a commercial place the situation is unsurpassed on that river. It is of ready access to the boats of the Mississippi, Missouri, Ohio, and Illinois rivers, and will, no doubt, become one of the great centres of trade in this country. Its trade now exceeds that of any other city on the river, except New-Orleans. It is also a point of departure for the American fur trade, for the lead mines of Upper Mississippi, and for the hunters, trappers, miners, adventurers, emigrants, etc., of all nations.

The following is an abstract of its trade, taken from a variety of authors, and shows a wonderful progress. This progress, however, is not more indicative of its own prosperity than it is of that of the Great West, which furnishes for it so extensive a commerce.

The following table (official) exhibits the amount of foreign goods imported and entered for consumption at St. Louis in 1852:

Sugar and molasses, foreign cost,	$413,172
Hardware, cutlery, etc.,	118,276
Railroad iron,	132,894
Earthen and glass ware,	80,729
Tin plate, tin, iron, copper, etc.,	59,826
Dry goods and fancy goods,	110,814
Brandies, wines, etc.,	32,985
Burr stones,	420
Drugs and medicines,	756
Cigars,	5,773
	$954,946

The amount of duties on imports was $293,298 74.

The principal products of the country, received at St. Louis for two years, as compiled by the Secretary of the Exchange, are given in the following able:

		1851.	1852.
Tobacco,	hhds.,	10,371	14,053
"	boxes,	8,380	12,388
"	bales,		300
Hemp,	"	65,366	49,122
Lead,	pigs,	503,571	409,314
Flour,	bbls.,	193,892	131,333
Wheat,	bush.,	1,700,708	1,591,886
Corn,	sacks,	1,840,900	344,720
Oats,	"	794,421	323,081
Barley and malt,	"	101,674	47,264
Beef,	bbls.,	8,872	11,165
"	tierces,	5,640	6,546
Pork,	bbls.,	103,013	66,306
"	tierces,	15,793	2,704
Lard,	bbls. and tierces,	52,208	42,515
"	kegs,	14,450	11,815
Bacon,	casks and hhds.,	16,791	11,285
"	bbls. and boxes,	1,564	1,790
"	pieces,	6,629	18,809
Whiskey,	bbls.,	47,991	46,446
Hides,		99,730	97,148
Bagging,	pieces,	2,746	3,650
Bale rope,	coils,	34,088	42,121
Sugar,	hhds.,	29,276	35,283
"	bbls. and boxes,	36,687	27,672
"	bags,		37,745
Coffee,	sacks,	101,904	96,245
Molasses,	hhds. and bbls.,	40,251	54,935
Salt,	bbls.,	46,250	42,281
"	sacks,	216,933	266,616
Nails,	kegs,	57,862	42,201

LEAD.—The product of the upper mines, received at the port of St. Louis is as follows:

1850,	567,496 pigs,	39,724,720 lbs.	Value, $1,766,750
1851,	540,000 "	37,800,000 "	" 1,577,600

There has been a constant decline in the product of these mines for several years. In 1847 they produced 778,469 pigs of 70 lbs. This decrease, it is said, is the result of several causes. Among these, emigration of the miners to California, want of sufficient economical machinery to drain the wet grounds, and want of sufficient capital, are the most conspicuous.

GROCERIES.—The annual imports at St. Louis, previous to 1845, were estimated at about two and a half millions, and the sales to three and a half millions of dollars. Since 1845, the grocery trade has about doubled. The total sales of the jobbing grocers for 1851 approximate $10,000,000, while the retail trade of the city approximates two and a half millions.

DRY GOODS.—The imports during the year 1851 were about $6,000,000, and the sales to the country the same year about $7,000,000, exclusive of the retail trade. Their importations were about three millions, and their sales nearly four millions, giving total imports about nine millions, and sales nearly eleven millions of dollars.

Iron will no doubt become, ere long, the heaviest manufacturing business of this city. Her iron ore is inexhaustible, and her coal is close at her door.

Flour.—The amount received for two years in the city, is as follows:

	1851.	1852.
Manufactured by the city mills, - -	408,000	393,184
Receipts per river, - - - -	184,446	131,333
" per wagons, - - - - -	45,000	89,461

The decrease of 1852 is imputed to the want of water in the rivers and the scarcity of wheat. The St. Louis brands stand high in the market. The mills are capable of turning out 3000 barrels a day.

Wheat.—In 1850, the receipts at this port were 1,808,817 bushels; in 1851, 1,665,347, and 1852, 1,591,886 bushels.

[The grain market of St. Louis is rather decreasing in importance.]

Corn.—Large quantities of this crop are consumed in the production of pork, and a greater amount was probably thus consumed in 1852 than in 1851. Beside, much of the corn is shipped from a point on the Illinois river to Chicago as cheaply and expeditiously as to St. Louis.

RAILROAD ROUTES TO THE PACIFIC

The journals of the day inform us that gentlemen of well-known ability have taken the initiatory steps for securing the very liberal offer of the government of Texas in aid of a railroad to the Pacific. It is said that the *bonus* offered will, with certain other grants already made, that can be appropriated to the same object, amount to a hundred million of dollars, while the road will not cost over twenty millions. Here, then, is "a chance" for capitalists, seldom equalled in importance.

We find in a recent *Boston Traveller* newspaper a communication on the same *general* subject, which we present to our readers. The writer, alluding to a former article, says:

"By the route which you describe there remain to be finished, between Boston and the Mississippi, less than 200 miles, and between Boston and the Missouri, opposite the Platte Valley, about 500 miles of railroad to complete the line of communication: namely, 150 miles from Indianapolis to Decatur, 40 miles from Naples to the Mississippi opposite Hannibal, 200 miles from Hannibal to St. Joseph, and 150 miles from St. Joseph to the Valley of the Platte. Thus two thirds of the distance from Boston to the Platte Valley have, by this route, been already overcome.

You are doubtless correct in your opinion that the Valley of the Platte must furnish one of the great railroad routes from the Missouri to the Pacific. But allow me to correct your statement that 'this route passes through the centre of the new territory of *Kansas*.' You intended to have written *Nebraska*, and not *Kansas*. Both forks of the Platte, running far north of Kansas territory, avoid altogether 'the Great American Desert,' through whose arid wastes flow the head-waters of the Kansas, Arkansas, and Canadian rivers.

You are also, doubtless, correct in the belief that within a very short period there must and will be an uninterrupted railroad communication from Boston to some point on the Missouri opposite the Valley of the Platte.

Indeed, I beg leave to remind you that already that communication is fully established to the Mississippi, by a route singularly direct, and lying, for almost every mile of its course, in the exact latitude of the Massachusetts Bay.

As far as Cleveland, Ohio, this route corresponds with the one described by you. At Cleveland, instead of leaving the lake, like the route which you have traced, and deviating very much to the south, it continues west nearly parallel with the line of Lake Erie to Toledo; thence through Southern Michigan and Northern Indiana to Michigan City on Lake Michigan; thence by the lake to Chicago in Illinois; thence over the Chicago and Rock-Island Railroad across Illinois to Rock-Island on the Mississippi, opposite to Davenport in Iowa. To this point there is now an unbroken line of railroad, and this point is only 300 miles from the Valley of the Platte. The Mississippi and Missouri Railroad Company, of which Gen. Dix is President, is now rapidly building its railroad bridge across the Mississippi, and its road across Iowa from the Mississipi to the Missouri at Council Bluffs, opposite the Platte Valley. Fifty-five miles of that road, namely, from the Mississippi to Iowa City, the capital of Iowa, will be in operation next December, leaving less than 250 miles of an easy, rolling prairie to be overcome in order to perfect the unbroken line of railroad travel from Boston to that old Buffalo trail up the Platte Valley, which has for ages led the countless herds of bison, and which for ages to come will lead the innumerable caravans of trade and emigration, from the great valley over the great prairie, through the South Pass to the Pacific.

Less than two years will probably send the scream of the locomotive across the yellow tide of the Missouri. The completion of the railroad from Chicago to Rock-Island 'has demonstrated that a railway may be constructed through a country of prairie, on the line of immigration, and yield a profit as soon as it is opened.' That road 'was opened by sections, and it yielded, from the moment the first section was set in operation, a profitable return.' 'The third month after its completion, it yielded $109,000, on an expenditure of less than four millions and a half.' When it 'was commenced in 1851, a considerable portion of the line was run through the public lands then unsold and unoccupied. There is now not an acre on the line of the road that has not been purchased, and that is not held at prices varying from $10 to $30. The construction of the road, by opening a market, has not only added 50 per cent to the prices of agricultural products in the district of country through which it passes, but it has stimulated production so enormously as to task the ability of the company severely to furnish the necessary transportation.' When it is remembered that in the prairie the settler has no timber to cut down and clear away, and no stumps to gurb out, that he can at once plough the sod and plant the seed, and that it is a constant—not a rare—occurrence for the settler who has paid the government price of $1.25 per acre for his land, to raise $20 or $30 per acre in corn within twelve months after the surface is broken, there is no difficulty in understanding how and why it is that the Chicago and Rock-Island Railroad has been thus profitable from the start.

The Mississippi and Missouri Railroad is a continuation of this productive route. It crosses a rolling prairie of vast fertility, in the direct line of immigration—across Iowa, a State whose population doubles in less than every five years, and which now numbers more than 300,000 inhabitants. The road will be opened by sections; first, from the Mississippi to Iowa City, then to Des Moines, and afterward to Council Bluffs. Already for more than 175

miles along its route the public lands are sold; and it is certain that the agricultural produce of the country and the merchandise for which it is exchanged will sustain the road as soon and as fast as it is constructed.

Beyond the Missouri, up the fertile Valley of the Platte, in the great stream of settlement and immigration, a railroad will soon become an inevitable fact, an unavoidable necessity."

FOR THE PLOUGH, THE LOOM, AND THE ANVIL.

RESPECTABILITY OF LABOR IN THE SOUTH.—FREE AND SLAVE LABOR.

MESSRS. EDITORS: Your Journal being appropriated to the advancement of labor, I think it legitimate to your columns that the position and relations of all labor, North, South, East, and West, should be understood. Not pretending to be very familiar with more than one portion, the Southern, I shall endeavor to avail myself of your pages to set before your readers some facts and opinions in relation to labor and the laboring man in the South: and also to show that good free labor can compete successfully with slave. I wish it expressly understood, that in these remarks my intention is not to wound the feelings of any of my American brethren. My desire is to cast in my mite toward allaying that asperity of feeling that I fear exists too extensively for the welfare of our Union. This feeling has principally been the work of the demagogue, a class who have ever been a curse to good governments. Unfortunately for us, they, like the father of evil in the garden, have insinuated their slimy folds into our national councils, and then have used for their own selfish ends the confidence of their constituents. These political vampires, though sectional in their views, are not so in their existence, being found everywhere. I am not attempting the part of the champion of slavery, nor do I expect to make my Northern brethren believe that the institution is a blessing. I am only anxious to disabuse their minds of *error*. I am willing to concede in the outset that the institution admits of abuse. Please show me the human institution that is free from that objection. Even our model government, especially in that part that gives it, in our eyes, the most favor, can, in its workings, exhibit a glaring defect. I refer to the doctrine that the majority should govern. Is it not here that much of this strife between the North and South has originated—the fear that the rights of the minority will be disregarded? Is there not an apprehension on the part of the South, that without additional slave territory their rights will be set at naught? Just here, I differ from a large majority of my Southern brethren. I question whether it is the true policy of us for a long time to come, to desire more territory for our peculiar institution. My reasons I will briefly state. We have millions of acres that are fertile, and in their virgin state. We need to concentrate, instead of scattering our population. Nine tenths of our emigrants would be native Americans, those that experience has proved to be the best materials to constitute republics out of. Emigration has the tendency to make large landholders, proving prejudicial to a proper system of education. Emigration diminishes our property, which makes the taxes heavier in sustaining our state governments, and interferes with the developing the resources of our country by internal improvements.

Having set myself right on this point, I will to my subject by asking the question, Is an employment within itself degrading, or is it made so by the individual engaged in it? Certainly the first question must be answered affirmatively. To illustrate. A man is looked on as degraded, who performs duties of common hangman, or one who acts as a spy for the police. I care not how elevated the situation of the individual may have been previous to his embarking in these employments, he will be looked on as degraded when he does. But reverse it: cause either of these individuals to whom we have referred to be engaged as an agriculturist, a mechanic, or merchant, and his former reproach will begin to leave him, and finally, if his course is unexceptionable, it will entirely disappear.

The next question that presents itself is this. If it is the calling that casts the stigma on the man's character, how is it that the negro, as my property, can degrade the employment that assisted to confer honor on the noble Roman who left his plough to save his country? It can not be, and this I shall endeavor to prove. A state of labor is a state of necessity growing out of man's disobedience to his Maker. The penalty attached to that disobedience was, that "in the sweat of his face he should eat his bread." To make the punishment greater, he inherited a disposition preferring rest to labor. Man labors not from choice, but necessity. Necessity then is his master, though frequently rewarding him in this our happy country most bountifully, if he is industrious and faithful in his work. But if he proves the contrary, the pinching hand of want punishes him, involving, unfortunately, his family with him. But in some countries where labor is abundant, he is rewarded scantily, being ever a stranger to those comforts that gladden the journey of life. It is sometimes the case that this master (necessity) forces him, in every land, into the employment of some tyrannical master, and because his physical powers are not beyond mortal man, he is sent adrift, probably with the reputation of being lazy and unworthy of employment, which character too often sticks to him like the coat of Nessus. Should he have a wife and little ones, they have to share in his suffering.

Most of the above applies to our blacks, but in an altered form. Circumstances have made the black man our property; necessity forces him to labor for us, for which he receives a good supply of clothing and food, while in sickness and old age he is cared for. Thus, if from no other cause, from pecuniary interest he is taken care of by his master. His master may unfortunately be unreasonable and cruel, but we have here a powerful tribunal, public opinion, that most generally forces him to respect the rights of humanity. But is our labor degraded because we have what might be considered complete authority over the laborer? If so, how do you look on the occupation of the gallant tar? He is completely in the power of his commander; but to him we are indebted not only for the comforts but luxuries of life, and by his dauntless spirit in maintaining our rights, we are respected everywhere. If this objection be well taken, and this the effect produced by this state of things, what think you of those who, at Lundy's Lane and Cerro Gordo, under the stars and stripes reaped a harvest of glory? Did not ninety-nine one hundredths have to acknowledge the unlimited authority of their superiors? The objection may be, that because the slave is forced to engage in labor he does not prefer, therefore labor is degraded. If that be so, what will you do with the thousands of white operatives that are forced into labor equally as toilsome, and often more prolonged, and more unhealthy?

The rule is thought to apply, that as a man is judged by the company he

is found in, that to labor with a slave is degrading. Let us see whether this is a general rule. Is it not where our associates are from choice, and not necessity, that this rule holds good, as in the pursuit of pleasure? As that of labor is one of necessity, can it apply? A man has to travel through a dangerous country, and unless he avails himself of the company of a black-leg, he would have to go in great peril. Is he degraded because he seeks self-preservation? Again: our country beats to arms. Is the respectable man who volunteers degraded because he is found in the same ranks with a man that makes swindling a profession? Can he not with reputation, side by side with him maintain the honor of his country? Do you in society place him on a level when it becomes necessary that they should both be found in the same ditch, spade and pick-axe in hand, making a fortification for their mutual safety? I think not.

The presumption is, that a parent's desire is to elevate and not degrade his child. How happens it, then, that a majority in Mississippi teach their children how to work, and that with their negroes? Many of them, even after becoming proficients, continue to do so until they attain maturity, except whilst they are at school. This is one principal source of supply of good managers. Leaving home at twenty-one, they seek employment as such, at small wages, agreeing at the same time to work with the hands, when the number is small. Very few persons owning under ten field-operatives, but who labor at the plough and other plantation work. But when the force is above that, they find full employment, by superintending the labor of others, with other matters pertaining to the concern. When there are fifteen hands or more, it is usual to employ a manager. Still, if the owner does his duty, it is impossible for him to live a life of idleness. In some cases, an overseer is dispensed with, where a trusty intelligent negro superintends the work of others. Where labor is performed, and carried out in this way, can it be degraded? It is impossible, and those who say it is, betray their ignorance, or are guilty of asserting a falsehood. As corroborative of my position that our labor is not degraded, permit me to offer a case in point. A young man owning ten or twelve hands, of little experience in planting, settled on a place adjoining one of our most respectable and wealthy citizens. He being a person of large experience, the young man called on him for advice, which of course he gave. Circumstances transpiring adversely, the young man found himself in the grass and weeds. He went to his experienced friend to know what he should do. Do you suppose he advised him to stand still, and not degrade himself by work? Very far from it. He asked him if he had an idle horse. If he had, to take off his coat, and lay hold of the plough-handles. In relating the case, the old planter concluded by saying that had he not taken this part of his advice, he could never have received any more from him.

This course of remark shows also that the belief that slavery creates an aristocracy that looks with contempt on the man that labors with his hands, is without foundation. As a class, we have nothing of an aristocracy, though there may be a few that are foolish enough to make such assumptions. When they do, the common sense of our community convinces them very soon of their mistake. I do say it without the fear of contradiction, that in Mississippi, where I have spent nearly forty years of my life, and that in different portions, the industrious honest man that toils for his daily bread is as much respected as he is anywhere north of Mason's and Dixon's line. How can it be otherwise, where a large majority have been the fashioner of their own fortunes? By doing so, they would be reflecting on their parents, and

on their own former situation in life. One thing we have reason to be proud of, and that is, we have very few that can be recognized as truly poor. Many have to labor, yet they feel themselves independent of the rich man, and are not objects of charity.

It is urged, that free can not compete with slave labor. As the price of labor is in a great measure influenced by the value of the commodity produced by that labor, and as that is ever fluctuating, it is difficult to be any thing like precise. But being informed as to the value of one great staple, which with us has a controlling influence, I can speak with assurance in respect to my own neighborhood. I shall then give what it is worth with us, leaving it to others to determine for other places.

A good field hand is worth, per annum, - - - - - -	$200
To feed, clothe, and pay the taxes, - - - - - - -	30
The time he may lose by sickness and bad weather, - - -	20
Doctor's bill, - - - - - - - - - - -	5
His portion of cost of overseer, - - - - - -	15
	$270

We have very few that hire themselves as laborers, except as overseers or mechanics. The reasons are, that most frequently our young men marry before leaving their parents, or soon after. Land being cheap, they secure a home of their own, which to a man with a family is far preferable to an unsettled life. The few that engage as managers receive for their services $300 to $600 for the year, with their board and horse found. On the Mississippi river, even more is given by many. Mechanics get $2 per diem, and more, with their board.

INFLUENCE OF AGRICULTURAL SOCIETIES.

BOOKS FOR PREMIUMS.

We have had occasion in former issues to commend the talents and personal influence of Mr. Brush, late President of the Franklin County Agricultural Society of Ohio. He has done much for the cause in his own State, and indeed over the country. We are happy to republish the following sensible remarks, first presented in his farewell address, on resigning his office of President, on the 29th of April last:

"The object of our Society being improvement, its efforts should be directed to disseminating light and knowledge. 'God said, let there be light and there was light,' where all before was chaos and darkness.

That our lands are not cultivated as they should be, we all know too well; and that the only way to remedy this great evil is to instruct our farmers in the right way, is too clear for argument. How is that instruction to be diffused through our country, and how is a correct agricultural education to be furnished to our farmers? Our Society has got upon the right track. That track is the awarding of agricultural papers as premiums. Hundreds and thousands will obtain knowledge in this way who would otherwise live and die in ignorance. Our Society should persevere in this, and increase the number of awards of this character. Those who desire to make money out

of the Society will object, but heed not their complaints, and they will soon cease, and what cause is there for complaints?

I have already shown that no man has any right to be paid for being better off, more lucky, or having better articles than others. And none can complain that receive such premiums as we offer. If we in our awards comply with our offers, we have fulfilled our contract. But there is one branch of improvement in an agricultural education to which I particularly invite your attention and the direction of your efforts. This is the instruction the Society can give to the farmers of Franklin county in the proper cultivation of the soil. It is the most important and at the same time most difficult of all the duties we have to perform, and, without performing this duty, we shall fail in the great object of our Association. This is a *vast subject*, embracing, when thoroughly understood, a perfect acquaintance with all the natural sciences and all the laws of nature.

The knowledge of geology and chemistry must be acquired before any claim can be made to the title of a farmer. Geology teaches us what are the elements of which this earth is composed, and chemistry how to analyze and discover them.

'Geology is indeed a magnificent science. What excites more the imagination? What exercises more the mind? Can we conceive any thing more sublime than the gigantic shadows and the grim wreck of an antediluvian world? Can we devise any plan which will more brace our powers, and develop our mental energies, than the formation of a perfect chain of inductive reasoning to account for these phenomena? What is the boasted communion which the vain poet holds with nature compared with the conversation which the geologist perpetually carries on with the elemental world? Gazing on the strata of the earth, he reads the fate of his species. In the undulations of the mountains is revealed to him the history of the past, and in the strength of rivers and powers of the air he discovers the fortunes of the future. To him, indeed, that future, as well as the past and the present, are alike matter for meditation; for the geologist is the most satisfactory of antiquarians, the most interesting of philosophers, and the most inspired of prophets; demonstrating that which has past by discovery, that which is occurring by observation, and that which is to come by induction. I am already an antediluvian, and instead of the horse bounding over the plain, I witness the moving mass of a mammoth. I live in other worlds, which I have at the same time the advantage of comparing with the present.'

Language would fail me, gentlemen, were I to attempt a description of the kindred science of chemistry, such as is contained in the above quotation of geology, and yet the science of agriculture includes both, as well as the other natural sciences.

Our Society can not teach these sciences to our farmers, but we can

1st. Induce them to educate their children, by convincing them that agriculture is a science, and not an art; that it is not to be learned by practice alone; that, in order to make thorough farmers of their children, it is absolutely necessary to educate them; and that the most profitable investment they can make with their money, and the best fortune they can give to their children, is a good education.

2d. We can give light and knowledge to the people by distributing amongst them agricultural papers of the first class, in which they will find the practical results of scientific farming, and can be improved very much in the management of their farms, and awakened to a necessity of having a higher degree of knowledge imparted to their children.

3d. By awards of premiums on farm crops, we can excite emulation and also inquiry into the best method of so cultivating the soil as to produce the greatest amount of crops with the least labor, and at the same time keep up the fertility of the soil.

4th. By the introduction of the best farm implements, we accomplish one point, to wit, the increase of crops to some extent, and the saving of labor.

But the greatest difficulty yet remains to be solved. Our farmers must learn *that where there is abstraction there must be restitution.* That practice alone, and being brought up to the plough from infancy, will not make a farmer. And that we are fast wearing out our lands, and instead of living on our incomes, we are spending the principal of our fortunes."

THE COAL-FIELDS OF THE WORLD.

From an interesting selected article, published in the *Practical Mechanics' Journal*, we condense a brief account of the coal-fields of the world. Great Britain occupies the first rank, both in the quantity and quality of her coal-production. The amount which she yearly produces is 32,000,000 tons. Belgium comes next, with 5,000,000 tons; the United States produces nearly the same quantity; France, 4,200,000; Prussia, 3,500,000, and Austria about 700,000.

Belgium, the second coal-producing country on the globe, is traversed in an east north-east direction by a large zone of bituminous coal formation, from which she derives her supply. This zone occupies an extent of 331,392 acres, or about one twenty-second part of her whole area. France procures coal from fifty-six of her eighty-six departments. This yield is divided among eighty-eight coal-basins, and comprises both the bituminous and non-bituminous varieties. Her production, which is now 4,200,000 tons, was at the commencement of the French revolution but 240,000 tons, the greater part of which came from two coal-fields. The greater quantity of her coal is inferior to that of the British. Coal is daily getting into greater favor with the French, and it may reasonably be expected that with increased demand and the growing facilities of railway transport, it will be reduced so much in price that it may be employed in gas establishments without the necessity of receiving aid from abroad. The national steam-marine of France even now derives its coal from Great Britain.

Many of the provinces of Prussia are rich in coal-basins similar to those in England. Peat, however, is in extensive use in Prussia, Bavaria, and Wirtemberg. At Berlin and its environs it is employed in almost all the workshops, and, on account of its application to the production of gas, its consumption is regularly increasing. Austria possesses extensive coal-beds, but the working of them has not yet been carried on to any great extent, there being a plentiful supply of wood, and at low prices.

The United States yields bituminous and anthracite coal in abundance. She is young and vigorous. She possesses railways and ships to aid in developing her mineral resources, and doubtless in a few years more her coal-production will be only exceeded by that of England. The following is a list of her principal coal-fields:

States.	Area of States. Sq. Miles.	Coal Areas. Sq. Miles.	Proportion of Coal.
1. Alabama,.....	50,875	3,400	1-14th.
2. Georgia,.....	58,200	150	1-386th.
3. Tennessee,.....	44,720	4,300	1-10th.
4. Kentucky,.....	39,015	13,500	1-3d.
5. Virginia,.....	64,000	21,195	1-3d.
6. Maryland,.....	10,829	550	1-20th.
7. Ohio,.....	38,850	11,900	1-3d.
8. Indiana,.....	34,800	7,700	1-5th.
9. Illinois,.....	59,130	44,000	3-4ths.
10. Pennsylvania,.....	43,960	15,437	1-3d.
11. Michigan,.....	60,820	5,000	1-20th.
12. Missouri,.....	60,384	6,000	1-10th.

The above table gives an aggregate area in 12 States of 565,283 square miles, of which 133,132 miles, or nearly one fourth, is composed of coal-beds. After making all due allowances for such coal-beds as would never be reached by the miner, we have left an enormous yielding area.

Canada contains no workable beds of coal, but Nova-Scotia, New-Brunswick, and Newfoundland are said to be rich in the article.

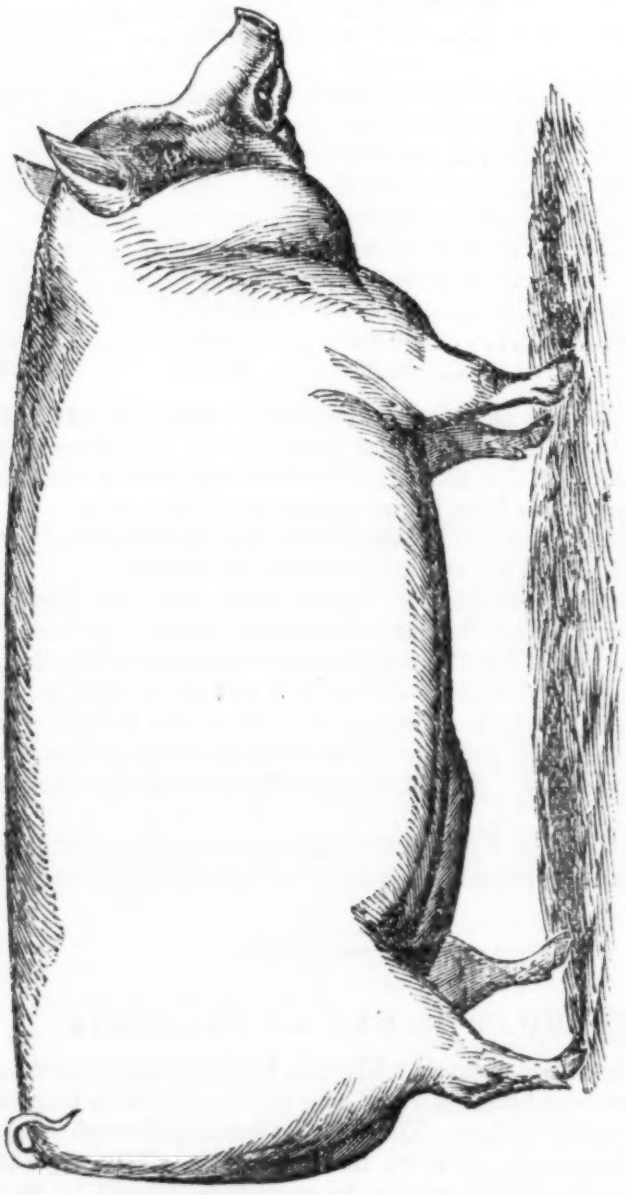
Most of the minor countries in Europe yield coal. In Russia, on the northern shore of the Black Sea, bituminous coal (brown) has been found in abundance. The richest Russian coal-field is on the shores of the Sea of Azof, between the Dnieper and Donetz rivers; it is said to be equal in quality to the best English, and may be delivered at a port on the Dnieper or the Don rivers for about 4s. or 5s. per ton. Little is known of the carboniferous system of Northern Russia. St. Petersburg is lighted with gas produced from English coal.

Coal-beds are found in Egypt and various parts of Africa and Asia.

China will doubtless become, ere long, a coal-producing country.

RAILROAD FARES IN VIRGINIA.

The Savannah *Georgian* says: "Virginia has for years borne the reproach of charging more exorbitant rates of fare on her railroads than the States either north or south of her. The traveller passing through Georgia pays not more than three cents per mile; in North and South-Carolina about the same. Reaching the Old Dominion, he encounters a tariff of four or five cents. Beyond that State he again finds himself where three cents or less per mile will pay his passage. But it seems, high as has been the charge on the Virginia roads hitherto, the public are to be called upon to suffer a still further imposition in travelling through that State. From the *Richmond Enquirer* we learn that the fare on the Richmond and Petersburg road, hitherto five cents per mile, is hereafter to be six—just double the rate at which our Georgia roads are declaring their handsome dividends. Those of our readers who know something about railroad management, will not be surprised to learn that the road above-named pays poorly. If its sapient president and directors would press the figures a little further, and carry up their charge to ten cents, it would probably pay *nothing*. True policy, both as regards the interests of the public and of these corporations themselves, suggests that they should rather do a large business at moderate charges, than do little at exorbitant rates."



IMPROVED SUFFOLK BOAR.

Bred by Dr. Morton, Etherton Farm, West Needham, Mass., for which the *First Prize* was awarded by the Norfolk Agricultural Society, at the Exhibition, 1853.

IMPROVED SUFFOLK SWINE.

The boar represented in the engraving carries with him his own recommendation. The improved Suffolks, as our readers well know, have an established reputation above all others. They can be kept at less cost, and fatten faster than any other breed; while the pork is more delicate and sweeter. They also mature early. At twelve to eighteen months old they weigh from two hundred to four hundred and fifty, or even five hundred pounds. Mr. Wm. Stickney first imported the Suffolks, and now Dr. Morton appears to be one of the most successful in breeding the improved varieties. He sells at prices from $20, $25, $30, etc., to $60 for sows; and his Prince Albert Boar he holds (if not sold) at $150.

THE AGRICULTURE OF JAPAN.

The islands comprising Japan proper and improper, are something over three thousand in number. The four principal ones have been compared to England, Scotland, Ireland, and Wales, with a similar size and climate. The soil is not naturally so good, but it has been rendered very rich and productive by the cultivation that has been pursued. Japan has about the latitude of Southern Europe, though the climate is colder. In portions of the empire deep snows lie for weeks and months in the winter.

One feature of the cultivation in Japan is that there is no waste land. So valuable is the soil that every inch of it is cultivated. The ploughing on the hill-sides is performed by men, while on the plains oxen and horses are used.

The soil of Japan is volcanic in its nature, and the farmers as well as other classes are interrupted in their business by frequent earthquakes. At times the destruction of life and property is immense.

The Japanese farmer is not independent, but a person of a low class, who hires instead of owning his farm, and allows his wealthy landlord six tenths of all he produces. Among the fruits of the earth in Japan may be mentioned wheat, barley, Indian-corn, rice. To these may be added beans and most of the vegetables common with us. Rice is one important crop, upon which the natives principally subsist. They scarcely ever partake of meat. The Japanese do not regard epicurean food as the greatest luxury, but a large number of devoted servants.

Most of the wild and tame animals found with us abound in Japan, though not, perhaps, in so large numbers. The cow is there, though the people know nothing of the use of butter and cheese. Horses they have in moderate quantities, and of different sizes and value.

It often rains in Japan for the most of the year. June and July are called the rainy months, as rain falls continually. By the falling of so much rain the streams are usually quite high and not easily fordable.

The mode of raising rice in Japan, and of wheat and barley, which is similar, may be thus described: The soil lies under water until the beginning of April. The farmers then turn it over with crooked hoes, or sometimes by oxen or cows. They sow the rice in small beds, about the breadth of a foot, separated by furrows of the same width. The furrows become drains. When about a foot high, the rice or barley is transplanted by women.

Other crops that are freely raised in Japan, are tobacco, cotton, tea, sugar, and, indeed, about every thing raised in the United States, and some few things besides. Fruits of almost every description, such as oranges, lemons, figs, pears, walnuts, chestnuts, are very abundant, as are vegetables, upon which last the natives much subsist. Among other things, the natives consume large numbers of turnips, raw as well as cooked.

Almost every house in Japan has a garden, and it is usually so constructed that the dining-room looks out upon it. The people take much pains that their gardens appear in the best condition and contain every thing "pleasant to the sight as well as good for food."

One strict regulation in Japan is, that he who omits to till his soil for one year, shall sacrifice it and be compelled to yield the premises to a more worthy farmer. It is by such rigid laws that there is no unimproved land in the whole empire. Various kinds of fowls abound in Japan, though the religion

of the country not allowing the people to eat meat, very little use is made of them. We read of the common barn-fowl, of geese, ducks, turkeys, etc.

The swine of Japan mostly run wild. Other wild animals abound, such as deer, bears, buffaloes, monkeys, foxes, hares, etc.

The farmers, so valuable is their land for cultivation, have cut down their forests principally. Coal is their chief article of fuel. The trees that stand are mostly of the greatest value, such as cedar, camphor, fir, cypress, mulberry, paper, and varnish trees.

The famous Japan ware, that used to be so fashionable with us, was varnished with a substance procured from the varnish-tree of that wonderful land.

Japan is a most interesting farming country in this respect, that all its produce finds a home market, so populous is the land. Not a dollar's worth of any thing is shipped to foreign lands, but all is sold in some part of the empire.

Altogether Japan is a most interesting country to the farmer.

"IS THE FIRST MILK POISONOUS?"

THE first secretions from the udder contain *colostrum*, the properties of which are not fully known. It is supposed to be a cathartic, provided by nature, and well adapted to the wants of the offspring, removing the viscid contents of the intestinal canal.

Diarrhœa, convulsions, and death have been produced in young children, by the too copious and long continued secretion of *colostrum* in the mammal secretions of their mothers.

Colostrum is not a secretion peculiar to cows, neither is it poisonous to swine alone.—O. C. GIBBS, M.D., *Perry, Ohio.*

On this subject, William Garbutt, an old experienced farmer of Monroe county, communicates the following to the *Wool Grower:*

"All rich food, when taken in too large quantities, produces injurious effects. Let a hungry ox eat too many raw potatoes, and they will kill him; let a horse have too many oats, or too much cold water when he is warm and thirsty, and it will founder him. Give a new-calved cow a pailful of rich milk-feed slop, and it will probably kill her; and it will have the same effect on a sow just pigged; too much raw whey will kill a pig, so will dry buckwheat when too much of it is eaten. But that is not evidence that all those nutritious and valuable foods are poison; it only proves the want of knowledge or lack of prudence in the feeder.

Give a cow after calving half a pailful of her first milk, and it will be very beneficial to her, by loosening her bowels and promoting her cleansing. Cows' first milk is rich and very loosening, and such food is injurious to sows heavy with pig. Instead of giving the sow the first milk clear, had they put it into the swill-barrel and mixed it with the other swill, it would have been very valuable to the sow.

The success of a breeder depends much on his prudence in feeding, to adapt the quantity and quality of the food to the wants of the animal. To produce the desired effect, at the least expense, requires much judgment and skill in feeding, and it has to be acquired by experience."

GUANO IN THE CANE-FIELD.

We take the following from a late number of the *New-Orleans Delta:*

ESTATE OF EDMUND J. FORESTALL, PARISH OF ST. JAMES.—VICTOR J. FORESTALL'S DIARY.

March 31, 1853.—*Sugar-Cane Plant.*—Opened a furrow between two rows of canes, put in a tract of guano, and covered the same by plough; prepared in the same manner twenty-five arpents, using about two hundred and twenty pounds of guano to each arpent.

Opened a furrow close to each row of canes, each side, applied the guano in the same manner, and putting in the same quantity as above on twenty-five arpents.

Note.—The above two pieces of land are selected for an experiment, because of their requiring renovation, and being used this season not to lose extra plant-canes remaining.

April 6, 1853.—*Corn.*—Applied to each hole one handful of guano, covering the same; sowed five arpents of corn.

April 6, 1853.—*Orchard.*—Prepared a circular ditch, one foot deep, of the diameter of each tree, put in a tract of guano, and filled up the ditch with earth.

March, 1854.—*Result.*—The above fifty arpents of guano canes turned out the largest and heaviest canes in the field, and produced first and second clarified sugars, two thousand five hundred pounds per arpent. On the same ground I had never before obtained more than one thousand pounds per arpent, and the canes were always small compared to other parts of the field; this season it was the reverse for both stand and size, and the ratoons promise unusually well. With guano, I feel convinced, no rotation of crop is required to produce the finest and heaviest canes in Louisiana. The canes with guano near each row were comparatively the best, and ripened earlier.

My corn-field produced on an average twenty barrels to the arpent; the five arpents of guano corn, accurately measured, produced forty-five barrels to the arpent. The orchard had never produced but very poor fruit, and always gummy, with abundance of worms; with the guano it produced an unusually large crop of delicious peaches, free from gums and worms; and some very old pear-trees, which had never produced before, a few very fine pears.

ESTATE OF BROWN BROTHERS AND CO., PARISH ST. JAMES.—FRANK LAPIEE'S DIARY.

April 27, 1853.—*Guano on Plant Cane.*—Selected my worst cow-lands, in four different parts of the field, on which I never had been able to obtain a large cane and a good stand; opened furrows close to each row, six feet apart, put in a tract of guano, say one hundred and fifty pounds per arpent, covering the same by plough, in twenty-five arpents; had a good shower immediately after.

June 3, 1853.—On this day no difference perceivable; added one hundred and fifty pounds of guano per arpent.

June 16, 1853.—Difference between the guano canes and the other plants in the field quite apparent, being of a deep green, and fully one foot higher than all other canes.

August 1, 1853.—Never saw a heavier stand and higher canes in this State than the guano canes on this day.

October 26, 1853.—Guano canes all laid down flat by their heaviness, and rains.

December 15, 1853.—Ground five arpents of the above canes, which weighed ten beaume, whilst other canes in the field only weighed eight and a half. These produced two thousand pounds to the arpent of refined sugars. Bad weather, and the twisted condition of the canes laid down, prevented my ascertaining accurately the yield of the balance of the twenty-five arpents.

June 16, 1853.—*Ratoons.*—Applied, as an experiment, two hundred pounds guano to two arpents of inferior ratoons; rain came on immediately after.

Note.—These ratoons soon afterward shot out rapidly, and produced double the quantity of canes of other ratoons in the same piece, and double the size.

March 16, 1854.—The guano ratoons have already a full stand, and are comparatively the finest in the field, so much so that I am preparing to apply some guano to as large a portion of the ratoons as I may be permitted to do.

GRAND NATIONAL CATTLE SHOW.

In our July issue we published a circular, calling the attention of the country to this great and important meeting, signed by the gentlemen of the "Local Executive Committeee." We have since received another from Hon. M. P. Wilder, President of the National Society, with a note inviting us to give it publicity. We do this, of course, with great pleasure, and by thus repeating the announcement, which, in both instances, though varied, is still official, we may perhaps induce a more general attention to the call. We have no doubt it will be such an assemblage as has rarely been witnessed in this country.

UNITED STATES AGRICULTURAL SOCIETY.

At a meeting of the Executive Committee of the United States Agricultural Society, held in the City of Washington in February last, it was resolved that the Society would hold no exhibition in any State having a State Agricultural Society without the assent of the officers, or of the Executive Committee of such Society.

The citizens of Springfield, Ohio, having requested this Society to hold an Exhibition at that place during the current year, and generously subscribed about *ten thousand dollars* to defray all the expenses of the same, and to guarantee the Society against loss, and the Executive Committee of the Ohio Agricultural Society uniting in the request, the Executive Committee of this Society have concluded to hold a National Show of Cattle, open to general competition, without sectional limit, on the 25th, 26th, and 27th days of October next, at Springfield, in the State of Ohio.

The friends of agriculture in all the States of the American Union, and in the neighboring provinces of Canada, are invited to coöperate with us, so that this exhibition may be the more extensively useful, and alike creditable to the generous citizens of Springfield, with whom it originated, to the contributors

and visitors who sustain it, and to the United States Agricultural Society, who are so deeply interested in its success.

In consequence of the holding of this Show of Cattle, the contemplated Exhibition of Horses at Springfield, Mass., and the Show of Sheep in Vermont, will be omitted.

The Journal of the Society, which the Executive Committee have concluded to issue once in each year—four numbers in one—will appear in January next; and will contain the Transactions of the Society at its last annual meeting, the lectures and addresses delivered at that time, a full and faithful account of the Springfield Show, with other valuable papers, by eminent members. This volume will be forwarded to all members who have paid their annual assessments for the year 1854.

MARSHALL P. WILDER, President.

WILLIAM S. KING, Secretary.

Boston, August 1, 1854.

MISSISSIPPI AN AGRICULTURAL STATE

MR. LIEBER, late geologist in Mississippi, believes that Mississippi must always be "essentially an agricultural State." In this he is no doubt correct. But at the same time we see no reason why a variety of mechanical employments may not be introduced, giving labor to thousands who would settle among them, and eat those grains and wear the wool, and consume many others of the productions of the State, and bear their proportion of the burdens of taxes, while they manufactured the shoes, etc., which all the people demand. Show us the community that can be said to flourish, in the highest sense of that term, without such a variety of interest. But we allow Mr. Lieber to speak for himself in the following extract from his report:

"Mississippi will never be essentially other than an agricultural State, and as such it takes precedence over most other States of the Union, and produces in various places a greater amount of cotton than can ever be made in older States. The richest soil is undoubtedly the alluvium. But of it we have two varieties, as already mentioned, an older and a newer one. The former is of a more bluish color, while the latter is of a deep chocolate brown, and for agricultural purposes the best. This, as a rule, is found nearer the river than the former. Next in value, as arable land, we have some of the superficial deposits above the tertiary—as near Vicksburg; but the surface consists of small but very abrupt hills, so that the soil soon washes away. The original growth is cane, pecan, and ash. At one time this region was very popular for planting cotton, but now the swamp is naturally preferred. The cretaceous formation ranks next as a fine soil-giving rock. The prairies are distinguished by two appellations, relating to their character of soil and native vegetation—the bald and the post-oak prairies. The former very frequently contain too much lime to afford the best growth for cotton or corn. The latter is always good for these purposes. The *quercus obtusiloba* is almost the only tree found upon these lands. The greater portion of the soils which owe their origin to the tertiary deposits, with the exception of those in the neighborhood of Vicksburg, can only claim mediocrity, as the soil is very thin, and, though very fair in itself, is soon transferred from its original position, if not worn out while still remaining there, and is then carried away to the river-bottoms and hammock-lands. The latter result has been materially

hastened by injudicious tillage. A great portion of the tertiary—almost the whole south-eastern part, as well as that in the north-east—consists of heavy beds of sand, which can produce but little, and can scarcely be said to enjoy any cultivation at all; for the facility of acquiring more valuable lands is still sufficiently great to enable those who can at all afford to move to leave these barren pine lands. In the counties of Tishamingo and Itawamba—except where the cretaceous rocks appear—we meet with perhaps the poorest land that can be found in the State, as may be inferred from the fact, that United States land may still be bought there for 12½ cents per acre."

GREASE, OR SCRATCHES.

Grease, or what is more generally known in the United States as *scratches*, which we look upon as a mild form of grease, is a disease of frequent occurrence. It probably originates, like many other cutaneous affections, in a foul habit of body—a retention of morbific materials in the system, or, more properly speaking, in the extreme vessels. The disease is most prevalent in the cold months, for then the function of the skin is more or less interrupted; the insensible perspiration, being neither so regular nor profuse as in the warm months, naturally leads to an accumulation of excrementitious agents. The heels of a horse, like the axilla (armpit) of man, are furnished with a large number of cutaneous exhalants, or secreting glands; and when the animal is in a state of health, the moisture, if it may be so termed, keeps the parts soft and pliant, lubricates the surface, and protects it from irritation. But when this humor of transpiration is not evaporated, in consequence of an accumulation of filth about the parts, or from the influence of cold, it appears at the surface of the skin in layers or incrustations. Now these incrustations may be the effect of a too copious discharge of excretory matter, which is perceptible in the inverse ratio to that of the kidneys and lungs. Variations in temperature check the cutaneous exhalation; and the reason why the heels are so often attacked with scratches is, because they are exposed to currents of cold air, are often covered with filth and wet, and chilled by a slow process of evaporation.

Mr. Percivall says, in his Lectures, "The etiology of grease throws considerable light upon its veritable nature. Horses who are at pasture or in straw-yards—in situations, in fact, where heat and cold are not naturally, and can not be made artificially, suddenly operative on the heels—rarely have grease. Those that have grease, in stables, are mostly coach and cart-horses, with thick, fleshy heels, and white legs, who are subject to get their heels wet, and do not commonly have such pains bestowed upon them to dry their legs as hackneys, hunters, and racers have; indeed, among the latter, grease is a very uncommon disease. Such horses also stand in stables hot and filthy from dung and urine, the very exhalations from the litter of which proves an additional excitement. Grease formerly made great ravages in the English cavalry and ordnance service; whereas at the present day the disease is scarcely known. This change for the better is ascribed to three causes—to the proper ventilation of the stables, the greater attention paid to grooming, and to the presence of a veterinary surgeon, who checks at the onset such casual occurrence.

Sainbel, who wrote An Essay on Grease, for which he was presented with

a prize by the Royal Society of Medicine in France, thus commences his paper: 'The grease is in general a cutaneous *chronic* affection, sometimes inflammatory, sometimes infectious; and I have known it contagious; it invades the legs of horses, asses, and mules, but seldom attacks those of the ruminating species.' We are told that cow-pock had its origin in the transfer of the matter of grease from the heel of the horse to the teat of the cow; and that the disease may be communicated to the human subject by inoculation with this matter, the same as with that taken from the ulcerated teat of the cow: some have gone further than this, and said that glanders and farcy could be generated in this way. The accounts of these strange transactions, however, have made but little impression, for we hear nothing of them now-a-days, and this is not a very bad criterion of their want of truth and foundation altogether. I have heard Professor Coleman say that there never was a well-authenticated case of cow-pock being produced from grease; and I verily believe myself—though I do not know that the fact has been satisfactorily experimented on—that there is no truth of its being communicable among horses. In certain seasons and situations, the disease is certainly sporadic, (affecting a few at any time or season;) but, then, the causes are too manifestly operative among horses under the same circumstances to refer its production to infection or contagion.

The symptoms of grease, in its simplest form, are, an exudation of a greasy, offensive matter from the skin covering and surrounding the heel, attended with preternatural heat, redness, tenderness, and occasionally general tumor of the heel and fetlock. Soreness or lameness on first leaving the stable is commonly perceptible, though it is seldom in sufficient degree to call attention to the disorder. And here I may remark, that the presence of grease is a pretty infallible test of negligent grooming; for, as may be inferred from this exposition of its nature and causes, a horse whose heels are kept dry and clean, and never suffered to grow dry of themselves, after having become wet, will be in little danger of contracting grease. Should the diseased action not be corrected, the inflammation extends up the leg, which, in consequence, swells, grows warm, and tender on pressure; so great, indeed, is the morbid sensibility of the heel, often, in this stage, that, if the part but be touched, the animal instantly catches his foot off the ground, evincing considerable pain. The greasy issue, by this time augmented in quantity, stands in large drops among the hairs, which show an inclination around the front of the heel to become bristly. No affection causes more pain or soreness on motion than grease; the heel itself being so very movable and sensitive a part. When both hind-legs are violently affected, the animal is often so lame that, when at first taken out, he can but with great awkwardness—evidently from excessive soreness felt, particularly in extending the heel—even walk at all: after he has walked for some time, however, this soreness diminishes greatly, or entirely leaves him, and he will trot with apparent freedom: this accounts for the many greasy horses we see in constant use.

. . . Pustules arise in various places, mostly around the upper and back part of the heel; these burst, and expose a raw surface, from which granulations arise in clusters, resembling (as Sainbel happily expresses it) 'the outward coat of a pine-apple:' these pustular excrescences are called by our farriers *grapes*."

Mr. Percivall continues to trace the disease to its more inveterate termination, and finally comes to the most important part, its treatment, which, he observes, "will be very simple or complicated, according to the duration, stage, and virulence of the disease.

. . . Should the case be a mild one, augmented issue be the only ailment, some simple astringent application will be all that is required.

Powdered alum,
Bole Armenian,* } equal parts.

Or this:

Powdered charcoal,
Calamine,† } equal parts.

A powder is generally employed, after which I myself prefer the form of ointment,‡ and for this reason—that, as the astringent powder has a tendency to suppress the secretion, the discharge will, sooner or later, become arrested altogether; at which time, the heels being dry, the skin grows hard and contracted, and disposes to crack; all which, I conceive, is in a great measure prevented by the ointment, artificially smeared over the surface. Though I ordinarily use the powder, therefore, in the first instance, I substitute some mild astringent ointment so soon as the discharge has become suppressed. Should the legs swell, walking-exercise, twice a day, in a dry and clean place, will be beneficial, and a diuretic ball may be administered every other night.

But, in every case in which the heels are hot, tumefied, and tender—in other words, in which inflammation is very active—I have no hesitation in saying that we ought to mitigate it, in the first instance, by assuasive means before we think of employing astringents. Some recommend fomentations; but they are inconvenient applications, and possess no advantage over a common poultice. And, of all poultices, the bran poultice, from an absorbed property it possesses, is one of the best. Where there is much fetid discharge, however, and a degree of malignancy about the case, a poultice of charcoal is to be preferred. At the same time, purgation should be put in practice, low diet, and even in some cases the abstraction of a *little* blood from the thigh [of the *doctor* perhaps!] will be advisable. As soon as the inflammation has subsided, astringents may be employed; they will require, however, to be stronger than those used for slight cases,§ and they ought not merely to be smeared over the heels, but spread upon pledgets of tow, and kept applied, by means of bandages, for two, three, and even four days together, without taking the horse out of the stable; during which time it is a part of my practice to give a strong dose of purgative medicine; at all events, the bowels should be kept moved."

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* "*Bole Armenian*—bole Armenic; a pale but bright-red colored earth, which is occasionally mixed with honey, and applied to children's mouths when affected with aphthæ. It forms, like all argillaceous earths, a good tooth-powder when mixed with some aromatic."—*Hooper.*

† Carbonate of zinc; a mineral containing oxide of zinc and carbonic acid, united with a portion, and sometimes other substances. It abounds in clayey soils. The calamine of England is, by the best judges, allowed to be superior in quality to that of most other countries.

‡ Powdered alum, - - - 2 drachms.
Simple ointment, - - - 1 ounce.

Or,

Citrine ointment,
Simple " } - - - equal parts

§ Sulphate of copper, (blue vitriol,) 2 drachms.
Alum, - - - - 4 drachms.
Bole Armenian, - - - 1 ounce.

Reduce them to a fine powder, then add

Common oil, - - - 3 ounces.

If a very *strong* astringent is desirable, we should use bayberry-bark—a remedy that can be obtained at small cost in any part of the United States. We (and probably Mr. Percivall) might think that alum, one hundred parts of which contain thirty-four of sulphuric acid, and which Dr. Hooper defines as a *powerful astringent*, is also an efficient escharotic for the most malignant cases, without resorting to that which destroys the living principle. Verdigris, *one of the ingredients of the Green Mountain salve*, sulphate, and other preparations of copper, act as virulent poisons, when introduced in very small quantities into the stomachs of animals. A few grains are sufficient for this effect. Death is commonly preceded by very decided nervous disorders, such as convulsive movements, tetanus, general insensibility, or a palsy of the extremities.

In Hooper's Dictionary we are informed that "the poison of copper is absorbed, and, through the circulation, acts on the brain and nerves of man. The preparations of copper are no doubt very acrid, and if death do not follow their immediate impression on the sentient system, they will certainly inflame the intestinal canal. The symptoms produced by a dangerous dose of copper are exactly similar to those which are enumerated under arsenic, only the taste of copper is strongly felt."

Some of our readers may desire to know how copper, and indeed other poisons, are diffused through the system when applied to sores. We answer, by absorption; which takes place with great facility on the surface of the sores; so that a portion of copper, received into the system in this way, will produce the same results as when introduced by the stomach.

Let us, then, reject the preparations of copper, and resort to less dangerous articles.

Mr. Percivall proceeds to recommend attention to diet and ventilation, and relates *an inveterate* case of chronic malignant grease; but as we seldom have such cases in the United States, this portion has been omitted. We can not, however, but admire the man who, in that early period of the history of our art, should recommend such a simple and, comparatively speaking, sanative system of medication. For let it be remembered that in those times the most inhuman atrocities were perpetrated on the bodies of uncomplaining brutes, and the most destructive poisons were called into requisition, to fill up the measure of their woes; for the law of humanity was then a dead letter, and every man did as he pleased. Contrast the treatment recommended by this distinguished surgeon with that of others whose chief agents for the cure of grease are *corrosive sublimate, muriatic acid, antimony, lead*, and we are led to exclaim, that a humane surgeon is more to be admired than the hero of a hundred battles.

In conclusion, we remark that scratches, which we have just defined as a mild form of grease, have been unusually prevalent in the New-England States during the past year. We have been called upon to prescribe for and treat a greater proportion of cases than in any previous year during our residence in Boston; the subjects of which disease, in a great majority of cases, were in a plethoric state. In short, there was an evident disproportion between the daily allowance of food and the amount of labor exacted. As regards the result of our treatment, some of the cases yielded readiy to local application alone, while others were more protracted, and required active general treatment—a purification of the fluids and a restoration of the healthy secretions.

The application which gave the greatest satisfaction was,

Pyroligneous acid, - - -	1 pint.
Linseed oil, - - - -	½ pint.
Sulphur, - - - -	1 ounce.
Bayberry-bark, powdered, - - -	1 ounce.

This was applied, by means of a sponge, every morning; at night the parts were washed with soft soap and warm water, then wiped dry, and the application again repeated.—*Dr. Dadd's Veter. Jour.*

WHEAT

To the Editor of the Plymouth (Eng.) Herald:

Sir: Having had an opportunity the summer before last of visiting some of the best-cultivated farms in this country, (probably in the world,) there was one, that of the Rev. Mr. Huxtable, near Shaftesbury, that had a remarkable feature—*great heaps of dung* lying about, which the respected proprietor said *he hardly knew what to do with*, as the land had already become so rich that the wheat fell down in wet weather. Yet this farm grows wheat every other year; that is to say, it is nearly one half in wheat, yielding about five quarters an acre; equal to two and a half quarters, or ten bags, per acre *per annum*. Now compare this with our Devonshire produce, which, I think, will average very little above ten bags of wheat per acre *once in five years*. If so, Mr. Huxtable's farm produces *five times* as much wheat as our average; and yet has increased in richness so much that he has actually a superfluity of manure. It must be interesting to our farmers to know how this was effected.

EXTRAORDINARY AND RAPID INCREASE OF PRODUCE.

The farm is about ninety-five acres; when he took it, a dairy farm, with only ten acres arable; carrying 14 dairy cows, growing 48 bushels of wheat and 40 bushels of beans, and employing three to four hands. It now produces 1600 bushels of wheat yearly; fattens 40 head of cattle, (including calves;) 100 sheep and 80 pigs; and keeps twelve laborers at work the year round. And this change was quickly made. Five years since, when many husbandmen were out of work, he ploughed up the land for the purpose of giving them employment; drained it, levelled the hedges, (all but the boundary,) and pared and burned the surface, and then tried how much stock he could keep, to raise the land to the highest fertility. After many contrivances, he found that by flooring his cattle and sheep-houses with boards, set a little apart to let the liquid drain between, (into a tank,) they needed no litter; and being thus independent of straw, except for the stables, he might keep as many cattle and sheep as he could feed; in fact, the straw saved from litter helped to make out the food. And beside the green crops and straw, he bought linseed cake, which, while it quickened the fattening of his cattle, improved the quality of his dung. And by this means he brought his farm in three years into the high condition above-stated. The liquid manure drained into the tank is pumped up to water the rye-grass, and enable it to be cut four or five times a year; yielding altogether about fifty tons per acre, weighed green; equal to ten or twelve tons of hay!

MANAGEMENT OF MANURE.

But there is an ingenious peculiarity in his management of the dung. During the summer he turns up a good deal of the clay subsoil, and burns it in heaps slowly, so as to be just charred, quite crumbly, and as light as possible. This he spreads out, when extinguished, under long rough sheds, (run up by his own laborers,) and upon it a layer of the drained dung, (free from straw, as before said;) then a second layer of burnt-clay, and another of dung, and so on alternately. As there are several of these sheds, there is time for the burnt-clay to absorb the rich drainings of the dung, and for the mere moisture to evaporate, before the next year comes on; so that, with proper turning over, it gradually becomes quite crumbly, and fit to spread out *broadcast*, and turn under like lime and ashes; and thus to mix so thoroughly with the soil as in fact to become a part of it; and its effect is proportionately quick and productive. And the estate now produces, as above-said, more manure than it consumes.

This is not mere scientific speculation. Here we have the actual produce of ninety-five acres, raised in three years from 48 bushels of wheat and 40 ditto of beans, to 1600 bushels of wheat; and from 14 dairy-cows with their calves, cheese, and butter, to 40 head of fat cattle, 100 fat sheep, and 80 fat pigs; so that, if even one quarter of our tillage-land was brought to this condition, our wheat produce would be doubled; we should be exporters instead of importers, and all our husbandmen would be in full employ.

But it will be objected that such a result requires not only skill and exertion, but a large capital and heavy expense of labor. This is true; but not really an objection. There is, in fact, no more objectionable practice than the too common one of taking more land than we have capital for. If the soil is half-starved and half-tilled, it will return only half-crops, and the farmer who entered worth little, will come out worth nothing—as hundreds can testify And on the article of *labor*, Mr. Huxtable's object was not to see how much labor he could *save*, but how much he could *use* to advantage; that is, not only how much produce he could draw per acre, but how many hands his ninety-five acres would profitably employ; and gratefully do those acres repay his attention, while he is still better rewarded by the prosperity of the laborers in his parish.

The increase of his produce, and the management of his dung, are well worth our farmers' consideration. If they would be content to take no more land than they can afford to work properly, they would have less anxiety and more comfort; and the land and the country would advance in produce and prosperity. Yours, sir, etc., ———.

FLAX CULTURE.

We give a portion of another very valuable essay on the preparation of hemp for naval purposes. That portion only is selected which treats of its cultivation:

"All sod-land designed for hemp should be ploughed in the fall. Land that has been in hemp the previous year should be broken the first spell of weather in the spring when the ground is dry enough to crumple up well. It should be made a maxim, in working land, never to plough or otherwise stir it, when too wet to pulverize well.

Timothy-seed, unless ploughed early in the fall, can but rarely be relied upon for a good crop of hemp; even then less reliable than clover-seed, and still less so than blue-grass sod. It is a good plan, the first year after breaking Timothy or clover sod, to cultivate it in corn; this, if done neatly, will always, of a fair season, insure a good crop of hemp the next year, and possibly three or four successive crops, depending much upon the quality of the soil and neatness of cultivation.

In dry weather, previous to the season of planting the crop, the land should be harrowed well; sod-land, until the sod is well torn to pieces; other than sod-land, well levelled, and, if not perfectly clear of clods, this is the time for a heavy roller. Plough, harrow, and roll until the ground is perfectly pulverized. Prepare the ground before the seed is sown; do this work well, if it is expected that the land will yield good crops and continue productive.

Immediately before sowing, the ground should again be well stirred by the plough; not permitting it to cut too much land, but, in farming *parlance*, plough close and deep; level with the harrow and use the roller again at this time, if the soil is not well pulverized. After this, except upon loose sod-land, the roller should be laid aside. Sow the seed upon this levelled surface at the rate of a bushel to a bushel and a peck to the acre, the larger quantity upon rich, fresh land, the smaller upon the less lively. I have sown nearly all quantities from three pecks to three bushels per acre, and believe the quantity above given to be best adapted to the purposes in view.

After the seed is sown, the harrow should be passed over the land both ways, that is, harrow and cross-harrow; and if the previous work has been well done, the land, unless it is sod that is not well rotted, is now level enough for all purposes, and much less likely to run together from heavy rains than when the roller is made to finish the work. This closing the work with the roller has always appeared to me to be an attempt to put a finish to the surface to hide imperfections that exist beneath. There is, in my estimation, a vital objection to finishing the planting of this crop with the roller. If it is to grow vigorously, it is essential that atmospheric air should penetrate the ground freely; this the roller certainly obstructs to a material extent. Unrolled sod-land is not subject to this objection. I fear that most farmers are not sufficiently impressed with the importance of so preparing their land for crops that there may be a free circulation of air in the soil, to the greatest possible depth." * * * *

RAISING FRUIT-TREES.

This is one of the most important of the farmer's duties, and one in the execution of which he can rely but little on the experience of the generations which, in this country, have been before him.

As to the value of fruit-trees, as a source of profitable income, all doubt has long since vanished. Fruit in great varieties may be profitably raised for home consumption, and the market is always open and seldom refuses a paying profit. A single orchard may fail—or a single variety of fruit—but this luxury the people will have, let it cost what it may. Apples, pears, quinces, plums, gooseberries, peaches, blackberries, cherries, grapes, and even walnuts, always find a market.

We know that orchards deteriorate, but still apple-trees live quite as long

as their owner. Fruits deteriorate. But this process is very slow, and new varieties take the place of those run out. The Newtown pippin has been a standard fruit for one hundred and fifty years, and is now as good as ever. The Baldwin apple has stood among the first varieties for more than one hundred years. If we are not mistaken, some of the earlier trees of these kinds are still in bearing. One pear-tree, at least, is known, which is over two hundred years old—the Endicott pear-tree, in Massachusetts; and we are told by Mr. Proctor, that another, eighty years old, has recently made twelve or eighteen inches of wood in a season. The golden pippin was commended as early as 1660, and has ever since retained its high rank.

Surely this is sufficiently "permanent" for a generation found to extend only to thirty years.

But beside well-known fruits, new varieties may be produced of equal value, and this department need be limited among scientific fruit-growers no more than the care of an old orchard Indeed, the latter needs more science than the originating of new fruit. There is no magic known only to a few, which will ever tend, in these experiments, to insure peculiar success.

Plant your nurseries, grow your trees, and try your chance among the rest. One new valuable fruit will pay for fifty failures.

CULTIVATION—WHAT IS IT?

SCRAPING, PRUNING, MOWING, PLOUGHING, ETC.

THIS is a great question. On its successful investigation depends all the farmer's success, and yet no question has received, perhaps, more various replies. Theories are piled on theories, till the plain working farmer is bewildered, and surrenders often all his confidence in any man's wisdom, whenever it goes beyond what his own eyes have seen and even his own sturdy muscles have actually wrought out. And after all the *science* expended on this subject, this doubting man is a prudent man. The probability is that the learned professor is mistaken—for a large majority of what has been written in the name of science was false, and is, sooner or later, almost universally discarded. We do not mean that the facts stated were fictitious, that the "wonderful crop" was not raised, and raised in the manner described. But the whole story was not told, and the theory founded on it and the instructions given in consequence of these supposed discoveries, were all fiction—mere idle dreaming. Important truths were entirely overlooked, perhaps unknown, and the influence of known facts quite erroneously estimated. The grand cause of failure or success is not understood.

Sometimes these mistakes in theories are harmless, or nearly so. For example: The question, "Whence do plants obtain their nitrogen?" discussed so learnedly by very learned men, and sometimes very acrimoniously by very ardent men, who ever solved this question so as to leave him unconcerned whether the soil was rich or sterile? If all the ammonia comes from the air, it is still true that the soil must convey much of it to the plant, and the requisites for this comprise all that is included in a fertile soil. Such cases, however, are very rare, and error should never be assumed as harmless. The rule is, ERROR IS DANGEROUS.

Just instruct your agricultural community in all the fundamental truths of germination, nourishment, and growth, etc., they will be as good farmers as they can afford to be; or as our venerable friend Col. Skinner used to say, show a farmer where, without any uncertainty, he can always sell a well-fatted hog at a handsome profit, and he will soon find out the most economical way of doing it. And this, by the way, is the key to OUR theory, (and his,) that the way to improve agriculture is to encourage all forms of American industry, and thus create a market always sure and always at hand.

We love to recur to *first principles.* We are perhaps peculiar for our jealousy of every thing that, in practice, seems to violate these principles. Now let us test some recommendations of learned men and truly practical men, by this method.

1. The order of nature is the best, and usually the only sure and permanent one, for accomplishing any one of nature's achievements; at any rate, *you can not* IMPROVE *it.* Now go into the forests. Trees grow and decay. Plants spring up, and bear flowers and fruit, and die. What these organisms secure from the earth and air, gives permanent fertility to the soil. Eventually, if not from the beginning, under ordinary circumstances, the plant will be found in its best condition, though there may be exceptions. Its rule of the natural growth is to adapt and harmonize all its conditions. The exceptions are accidents.

Now what does nature do in this great laboratory? She furnishes decayed vegetable matter—her own flesh and blood and bones. She lops off dead branches and those too ponderable to be sustained, even at some peril to its own permanence; it adapts its dimensions, horizontal or upward, to its relative circumstances; it finally drops its seed, that sprouts again, or its fruit, not always or often on the surface of a dry dusty soil, but in the rich mass of decaying vegetation, or of that green growth which at once shelters and by and by nourishes it. We need not extend this summary. The reader may do so as occasion requires it.

Now test by these simple facts, any given operation in agriculture.

Moderate pruning (not a promiscuous cutting and slashing) has found its precedent in the workings of One wiser than man. MULCHING and MANURING are seen to be "by authority." Scattering seed broadcast upon certain soils is the true, the actual security for unbroken successions of seed-time and harvest. The dying animal is sheltered under green branches, and repays the service by furnishing to the plant the elements of its increase in their most active forms.

But who *scrapes* the trees of the wilderness and the grove? Who goes about tearing off the skin or the clothing of any vegetable thing, except as a destroyer? Who changes the whole aspect of this beautiful world by daubing it with white-washes, or yellow washes, or washes of any other artificial hue?

It seems to us that the Creator was but partially instructed in the *science* of agriculture, or else failed to finish what was so well begun, or else some of our teachers are utterly and fundamentally in error.

Are we asked, Where is the propriety of ploughing taught in this book of yours? We reply, in the mellow soil beneath every vigorous natural growth. The whole world is not a garden without culture, and never will be. Had it been so, how much value would have been destroyed by the myriads of men who have dug out the solid walls of temples, and castles, and pyramids, and the vastly greater supplies requisite for our own and our father's homes! What waste it would have been to have made a garden which must

be turned into a mine before a single permanent habitation could be built! But we will not go in chase of cavils; nor tax ingenuity for exceptions. The general truth must be as we have stated. Much of the barrenness and unyielding condition of our soil is man's own work. He creates his own necessities.

In some issue of the last year, we expressed views very concisely, kindred to those above given, and continued reflection and observation confirm us in our position. We were, therefore, well pleased to see, some time since, sundry resolutions of the *Massachusetts Horticultural Society*, which, if it does not embody "all the talents," its catalogue contains the names of gentlemen practically and theoretically wiser, more learned, and more successful in this department, than any other Society we have ever known, and its board of directors, when it gives an unbiased vote, is worthy of more confidence than that of any other within our knowledge. These resolutions indirectly and partially inculcate the doctrine we have here advocated. For example: They say that lichens or mosses are not the *causes* but the *consequences* of disease and decay, and that the habit of scraping the tree, thus conditioned, is positively injurious; that if insects which are injurious to the tree, are known to exist on a given surface, they should be removed by gentle rubbing with a stiff brush, by washing, etc., and that "alkaline washes" are injurious. We say amen to all this.

It is curious to note the differences between the notions that prevail in *vegetable* and *animal* physiology. In the latter, it is frequent washing in pure water, the utter disuse of all cosmetics, and even of soaps, which is so urgently taught. Nor are these views new. They have long been known and practised. On the other hand those who use washes and powders soon reduce their skins to a condition in which it does not in fact look fit to be presented in company, and the evil is, it is constantly growing worse, and they will be too ugly, if they live to be old, for even paint to save them.

Why should not the analogy hold good between these different organisms, the animal and vegetable? Why do violence to the skin of the tree? Why fill its pores with any foreign substance?

Of course we do not allude to remedial operations. Our topic is culture and not cure. When diseased, plants and animals may, in extreme cases, require a thorough coating of poison, for aught we know, though we are not now aware of any such case. We do not see why an active plant should be treated as if diseased because here and there abnormal symptoms are discovered.

Most of the enemies of fruit are insects, and these modes of practice form a very inefficient protective against a good pair of wings.

Certain practices are resorted to by florists and others for producing elegant flowers, which are artificial in every sense of the term. They are efficient, and for aught we know very proper. But the reason is that the gardener wishes to produce something that nature never attempted. If one has a desire for new hybrids, or "monstrous" developments of petals, etc., as the botanists would correctly describe them, the course of practice is plain for him. This is easily accomplished. But all such operations are abnormal, and most of them are attended with more or less danger to the permanence of the plant. Florists generally secure elegant flowers at the certain cost of the premature decay of the plant itself, and their whole course of practice consists very much in devising expedients for frequent succession as a substitute for permanent growth. Plants purchased of "scientific gardeners," seldom do well under ordinary cultivation. An apple may be grown much larger than the natural size, by nipping off a good portion of fruit-buds on

the same growth, but we do not believe that *more fruit* is actually secured by any such process. A tree may put forth its buds under unnatural, excessive excitement, and become unable, afterward, to mature what was thus forced in its early developments, and then nipping the buds may be desirable. For even inanimate nature sometimes does her most under unnatural excitement. But this is a remedial process, and should not be confounded with those general principles of culture and those every-day requisitions of a healthy growth.

Weeding is necessary for securing a good crop, on the same principle one would nip off half the buds of his apple-tree. The farmer would concentrate all the energies of his land on a given growth.

FOR THE PLOUGH, THE LOOM, AND THE ANVIL.

STEAM-CARRIAGES AND THEIR ENEMIES

BY J. K. FISHER.

I HAVE been told, by engineers and others whose judgment I esteem, that although the mechanical difficulties of steam-carriages are such as can be entirely overcome, there are others which can not so easily be dealt with. Among these are the adverse interests and prejudices of men, especially men who are grossly ignorant: they begin by scoffing at theory, as unworthy of the least respect, and end by putting forth their own crude notions, and claiming for them implicit belief. And beside these opponents, there will for a time be the difficulties arising from that roughness in roads which is deemed necessary to fit them for the traction of horses.

Chief among the worst opponents are those whose interests, prejudices, and conceit blind them in all directions, and whose subsistence is drawn from the payments made by inventors for their supposed influence in the Patent-Office and in the estimation of the public. These pretenders will praise all inventions, however bad, whose authors employ them as their agents, or pay them for puffing and advertising; and they will condemn, without the slightest regard to truth, all they dare to condemn, whose authors do not pay them *black mail.*

But these discouragements, I have replied, should not deter one from attempting what he knows to be feasible, and is sure to be useful when once established. It is moral cowardice to shrink from dangers not yet present, and from which one could not shrink without disgrace if they were present. If the vulgar leeches who can not bleed you will certainly avenge their disappointment by slandering you, must you therefore shrink from your task, and thus be in a measure their slave?

The sense of interest is often falsely alarmed, and assumes a hostile attitude, when, if enlightened, it would be friendly. It was a false alarm that made some of the English road-trustees hostile to steam-carriages. But this alarm was not without a foundation in "incontrovertible facts," which I shall here state and explain, as a matter of prudence; for the false notions that arose from them yet prevail.

Hence, while it is a part of manliness to advance, in defiance of obstacles, it is but prudent to deprive them of their power, if that may be done, by showing the causes of former ill success. I therefore avail myself of your

invitation to review what has been done on this subject—to find where we already stand, as a ground from which to view what is yet before us.

In 1804, Richard Trevithick built a steam-carriage, which, while it worked so efficiently as to demonstrate the power of steam to work effectively on roads, was accounted impracticable, in consequence of a slipping of the wheels; and the general conclusion of the engineers and the public was, that, in difficult situations, the wheels would turn round without moving the carriage forward. Even Trevithick himself did not discover the means at his hand to obviate this difficulty; and he confirmed the opinion by proposing, in his specification, to put spurs into his tires, to prevent slipping.

As a means of overcoming this difficulty, Brunton invented an imitation of horses' legs and feet; and after him, in 1824–5, David Gordon and Gurney invented improved legs and feet. Gordon's feet resembled scrubbing-brushes, bristled with spikes. Gurney's were not much better, as to their effect upon the road. Both were tried, and the trustees saw that they tore up the road far more than horses' feet did.

It is singular that men of talent did not at a glance see that one of these feet, which was pressed down with a comparatively small force, would be more likely to slip than the wheel, which is pressed down with the whole weight upon it, in addition to its own weight. These feet did slip, and scratch and tear up the surface; and beside this, there was a mechanical difficulty in working them.

Here, then, was this dilemma: "the wheels can not be made to propel the carriage; and the legs won't do, because they destroy the road: steam-carriages therefore won't do, anyhow." This view once established, it was a work of time to correct it. And before it was corrected, the road-trustees succeeded in getting upward of fifty toll-bills passed, for roads on which it was supposed steam-carriages would run, all of them imposing tolls that were prohibitory, or nearly so. There was a universal panic among road-trustees, about 1830, when these dreaded steam-carriages were declared to have become so perfect as to be able to run with profit; and large capitals were being subscribed to work them. A liberal man, of some wealth, Sir Charles Dance, purchased of Gurney three carriages, and placed them on the road between Gloucester and Cheltenham. All the jockeys and bigots, from the first, opposed them in every possible way. The trustees got a toll-bill passed, and put upon the road such heaps of broken stones, that horse-coaches were stopped by them; and a steam-carriage, though it ran over them several times, had its axle broken. It did not avail that the legs had been thrown away, and that the wheels did not slip: the invention had got a bad name, and time was required for it to establish a good one.

It is instructive to observe the origin and growth of this erroneous notion that wheels will not impel carriages. Trevithick did not foresee the least difficulty of the kind, and built his carriage with one engine instead of two, each of half power. And he did not see that letting on steam suddenly would cause more slipping than if it were let on through a throttled opening, or wire-drawn. His steam was got up to a full pressure, and let on through a wide opening; and the wheels slipped round, without getting the carriage out of the soft place in which it happened to stand. The spectators, among whom was Gurney, then a boy, went away with a new idea in their heads, which they held for twenty-three years.

You may now often see a locomotive draw eighty times its own weight behind it, and not slip its wheels. Yet you may see the same locomotive, with nothing but its tender, slip its wheels at starting, when managed by

an inexpert person. You often see the wheels slip and whirl round when a locomotive is starting a heavy train; and you then observe streams of sand running from pipes to the rails, and men pushing the train. In a minute all is right. Now if an ignorant person, who had never before seen a locomotive, nor heard of its "practicability," were to attempt to start such a train, he would probably work until he was hungry, and then give it up, and for the rest of his life declaim against all who should propose to use locomotives without legs, toothed rails, or gearing all the wheels together, or in some way providing against the "incontrovertible fact" that wheels will slip.

Gurney, after much trouble with his legs, happened to ask himself whether the wheels would not *help* to impel, nay, perhaps, do all the work on gentle descents, or even on a level; and he recollected that Trevithick's carriage was said to have run—perhaps without spurs. So he contrived a combination. He made a cranked axle, and made his engines turn his wheels, as is now done; and, in order to be secure against slipping, he put small legs upon the rims of his wheels, all around. Great was his delight when "this carriage went up Highgate Hill, in 1826, and to Edgeware, also to Stanmore, and went up Stanmore Hill, and Brockley Hill, near Stanmore; and against all those hills the wheels never slipped, and the legs never came into action. After these experiments, the legs or propellers were entirely removed; and from further experiment it was found, by a peculiar application of the steam, (namely, by wire-drawing,) that the bite of one of the hind-wheels was sufficient for all common purposes. If the steam was let on suddenly, the wheel would turn round, and the carriage not go forward; but when wire-drawn, one wheel was found sufficient."

By this experiment of Gurney's, we see that Trevithick, although he had one large cylinder, which is more likely, in the proportion of ten to seven, than two of half size, to slip the wheels, wanted only a delicate throttle-valve, and the knowledge of its use, to make his carriage run without slipping, if both wheels were fixed or clutched upon the axle. Thus the want of knowledge respecting a slight matter of detail, and the ignorance of a remedy for an evil that now exists, and is often troublesome to the ignorant, begot a prejudice that still pervades the minds of that great proportion of men whose habit is to doubt whatever they do not know, and to deny whatever they doubt. I am pestered with conceited bigots, who every day see locomotives draw fifty times their weight, and who yet gravely assure me that the wheels of a carriage will slip so that it can not get its own weight up a hill. In vain I point to the locomotive. "That," they reply, "is a different thing. If you can make a steam-carriage as heavy, you will then get adhesion, and you can go up-hill. But how can you get up with a light carriage? Nonsense! You see you are in this dilemma: If you are light, you slip; if you are heavy, you crush a common road; and you must therefore have rails."

Of course it is not to be expected that minds of the second order, much less those far below, will know by any means but sight of the solid reality and the actual fact. They can no more know by a process of reasoning, from facts already established, than they can see round a corner. And they rest as confidently upon their mere ignorance as a philosopher rests upon the conclusions he has logically drawn from established laws; and sneer at his "theories," while they are sometimes filled with dislike, and even hatred, for those who do not promptly believe the dictates of their blind egotism.

It may seem tedious to dwell upon this point; but in science, as in morality, people "perish for lack of knowledge;" and millions are wasted, and schemes fail that are within two dollars of success because men rest assured in their

ignorance, and do not ask if a remedy exists for the difficulty they encounter, nor *measure* and *weigh* the difficulty at all. The engineer who carefully looks at the drawing of Trevithick's steam-carriage, will say that, defective as it was, it would have run well if it had been provided with a good throttle-valve; and he will not doubt that the skill of that able engineer would have improved the invention, had he been furnished with means to introduce a number of carriages; and that the united talent of the country would in less than five years have made steam-carriages profitable.

These lions are now out of the path. What now hinders? More lions: always more lions; sometimes one at a time, sometimes several at a time—never less than one. Your ordinary man, when life is in peril, feels the impulse of honor and the dread of shame, and will march up to a battery of cannon; but when his gingerbread is in peril, the sense of honor and the dread of shame forsake him, and he says: "What if we should meet several lions? What if the omnibus men should run us down? What if a corrupt council should stop us, unless we pay them forty thousand dollars? What if a corrupt editor should demand black mail? My *dear* sir, you don't know the men you have to deal with! If we make money, we must share it with them. If we don't make money, they will hold us up to ridicule. No, no, my *dear* sir. I fear we shall be run down or used up some how by these leeches! We must wait for the good time coming." Such, in a concentrated form, without caricature or exaggeration, is what I hear from hundreds, who, when their higher sentiments are appealed to, would peril their lives, and give largely from their wealth. And such are the feeble yet victorious enemies who for fifty years have resisted the progress of an invention which the best engineers in the world have indorsed; and which, when introduced, will change the rough and dirty stone pavement to a smooth and clean iron floor.

It will be amusing, perhaps instructive, to read a description of one or two of the complex inventions to overcome this difficulty of slipping. It is probably to such contrivances, and their signal failures, and mischievous effects, and ludicrous and clumsy imitations of the perfect work of nature in the locomotive apparatus of animals, that we owe the rooted prejudice against steam-carriages. The name brings up a vague idea of complexity, expense, and a strange mechanical animal, afflicted with St. Vitus's dance, that may run over you, or run away with you.

Alexander Gordon (see "Treatise on Elemental Locomotion," p. 47) thus describes the inventions of David Gordon, his father. The first, patented in 1822, consisting of "a high-pressure engine, made after the pattern of Mr. Trevithick's, and having the wheels made with teeth, worked into a rack in the interior of a large rolling-drum, about nine feet in diameter, and five from end to end. The steam-engine climbed up the interior of the drum, like a turnspit dog or squirrel, and the large drum, rolling onward, drew a carriage." Two years ago, this invention, or one much like it, was actually built in Bridgeport, Conn. It does not appear that Gordon ever built it.

The next, patented in 1824, was "an arrangement by which an action similar to a horse's feet would be obtained. This was effected by six hollow iron legs, at the lower extremity of which there were feet to push upon the ground. These legs were connected by brasses, straps, and keys to the journals of an eight-throw crank, which was turned by a pair of steam-engines on the same shaft. This crank pushed out the legs backward, and the carriage ran forward. The legs were thus projected in succession, 2 following 1, and 3 following 2; then 4, 5, and 6 following in the same course, each

pushing the ground. By following this motion of the feet, it will be seen that they trotted round in an oval figure, which a line drawn through the figures would describe; this oval being formed of two diameters, one of the large crank, and the other of the small crank. The little crank lifted the feet off the ground as they finished their work. The crank-shafts were connected by a spindle, having on each end a mitre-wheel, to gear into a mitre-wheel on its respective shaft, so that the large and small crank-shafts revolved simultaneously, and parallel to each other. To prevent the feet bounding off the road, without taking hold and pushing the carriage forward, it was found necessary to use lifting-rods, which were hollow, each having a small solid rod in its interior, which was pressed out by a spiral spring in the hollow rod, so that these lifting-rods were lengthened when the feet got into a hollow, and shortened if the feet got on a stone or eminence."

The drawing of this carriage exhibits the larger shaft with ten cranks: two double cranks for the engines, six double cranks for the legs, and two single cranks for rods to connect it with the smaller shaft, which had two single cranks for the connecting-rods, and six double cranks for the lifting-rods; making fourteen double and four single cranks; and the mitre-wheels and spindle are left out—a variation which probably escaped the notice of the author.

This carriage is spoken of as if it were actually built. Alexander says: "I had found that the propelling feet do more injury to the roads than the propelling wheels." The editor of the *Scientific American*, who was a boy at the time, says that two carriages, "Gordon's improvement on that of Gurney's," ran in 1833, and that he rode upon one of them, and that they were well built, and had fair play; and yet failed to make as good time as two-horse stages. I find no account of such carriages in Alexander Gordon's work, published in 1834, nor is there the least notice of them in the *London Mechanics' Magazine* of that time, nor in *Hebert's Encylopædia*, published still later, nor in any other work I have seen. As his account of the failure tended to deter those who read it from investing in my enterprise, I called upon him, and asked him to show me the work in which I could find a full description of it. I also particularly asked him which Gordon planned the carriages. He told me, Alexander. This led me to accuse him of inventing a false account, to punish me for declining to pay the usual fee for having my invention described and advocated in that journal. But in his paper of August 5th, he charges me with a false statement, in saying that "Gordon never built a carriage." If he had recollected that he told me it was *Alexander*, or if he had observed that I said, "Having read Gordon's 'History of Locomotion,' published a year after the alleged failure of *his* carriages, and found no allusion to them in that," he would have seen my mistake, and been a little more gentle in his reproof. He is the only author I know who ever mentioned the event; and he himself misled me by his mistake in the name —Alexander for David. He should therefore not have been angry because I believed that he made up the account. If he deemed that I ought to have seen him before making the statement publicly, it might mitigate the blame; but I went several times to his employers, and asked to see him, and was refused, on the ground that my complaint was trifling, and his time was theirs.

Having made this apology for questioning the veracity and the motives of this arbiter of inventions, I must take the liberty to question his judgment, and dissent from his general conclusion, that because two carriages built on this plan failed to make as good time as two-horse stages, and failed to pay, no steam-carriages can be made to beat horses or to pay. As a boy, at the

time, he might have felt a patriotic admiration for the superiority of Gordon's carriage-legs over the legs that Gurney had given up six years before; and having made up his mind, it is not to be expected that he will ever change it, or trouble himself to read the evidence that proves, clearly enough, that carriages without legs have run at from twenty to thirty-five miles an hour, and worked at half the cost of horses, and would have been profitable had they not been subjected to outrageous tolls, and other opposition. His confidence that the genius of his countrymen could not fail where success was possible, is characteristic; but surely a Yankee, on the same ground, may be allowed to flatter *his* national vanity, by hoping that, if he "hangs on like a bull-dog to a *bare* bone"—if he does not let go in the day of small things—he may, after a-while, get ahead of the great genius of Scotland, whose carriage-legs "trotted round in an oval figure," and adapted their length to the inequalities of the road.

Seriously, could I have supposed it possible that the *Scientific American* intended to say that such a totally unnecessary, however ingenious, apparatus as this system of legs, and a carriage propelled by them, was a fair criterion of the capabilities of steam-carriages? I never dreamed of his being such an egregious mechanical quack, until his own declaration that *David* Gordon was *the* Gordon. Even now I can scarcely credit it; but when forced to choose between the two horns of an unpleasant dilemma, I, if possible, prefer that which I would have others prefer if it were my case. A very good man might think highly of Gordon's carriage, and fancy that neither Gurney's, nor any other, could ever beat it; but to be suspected of being a mere tool for the collection of such taxes, would be to lose the esteem of every one who entertained the suspicion.

If the reader supposes that I am joking, I beg him to recollect what I just stated, that the other contrivance of David Gordon was actually built, within two years, in Bridgeport. Beside, about three years ago, a gentleman called on me, and told me he had just seen, in Paris, a steam-cab, which ran with legs; and the general ignorance on this subject is such, that it would be easier to get stock subscribed for such a carriage, than for one that might be deemed the *ne plus ultra* by engineers. I really do not deem it incredible that this editor is sincere.

The second plan of Gordon is not more absurd than the first; and it seems that France has furnished the crooked ingenuity to get up one similar to it; and I know many who are of opinion that hills can not be ascended by wheels alone. Such is the state of gross ignorance and obstinacy, and such the unbelief of testimony, that it is not believed, by many who daily see locomotives draw heavy trains, that light steam-carriages can go up-hill alone; and this is one of the reasons why the project is looked upon as impracticable. And this need not be wondered at in persons who do not pretend to have studied engineering, when we see the editor of a paper of such lofty pretensions as the *Scientific American* calling this carriage of David Gordon's an "improvement on those of Gurney," and considering its failure as a proof that steam-carriages never can pay. Thus it happens that the early and imperfect carriages are among the worst enemies of the invention, not because a single man of good sense would infer from the failure of early efforts that success can never be attained, but because impudent quacks, who attempt to teach the public, have not sense enough to study a subject before they write upon it. Well, this "improvement" is about equal to the plan of two ships hitched together, with endless chains going under their decks and over their masts,

and around their shafts, to turn their paddle-wheels by the power derived from the motion of the sea, which causes one vessel to go up while the other goes down, and the chain to trot round in an oval, or parabolic, or diabolic figure, and thus to give motion without the aid of steam. This plan the *Scientific American* has laid before the public, as something worthy of the celebrity its columns can confer. And this is the critic of inventions who calls my steam-carriage rickety.

In 1811, Blenkinsop, imagining that light locomotives would slip on rails, took out a patent for a rack to run beside the rails, in which a toothed wheel of the locomotive worked. Chapman, in 1812, patented a locomotive with eight wheels, all connected by gearing; and Stephenson, in 1815, built one with wheels connected by gearing chains. So not only the steam-carriage men, but also the railway men, have some queer fancies to answer for.

It may appear frivolous to notice these rattling complications; but the improvement of the steam-carriage has consisted chiefly in the removal of them. A few more remain to be noticed: these I have removed or omitted; and I find them as unnecessary as the legs. Gurney, Hancock, and others, deemed it necessary to leave the wheels loose upon the axle, and hold them by clutches, so that, in turning, one wheel would be unclutched. Without this arrangement, they found the steering-wheels would slip laterally, and the carriage could not be turned. It appeared to me that by putting the drivers near together, and the steering wheels forward, and by putting the weight well forward, the carriage could be made sure of turning, although both wheels are keyed upon the axle. I find that this is correct. I have not been troubled with the slipping of the steering-wheels, except when overloaded behind. For a drag, to draw other vehicles, this is the best arrangement; for a single carriage, which is required to turn short and frequently, it is sufficient to key one wheel. The clutches, and the trouble of using them, are therefore got rid of.

Beside the opposition that arose from the monstrous notions engendered by these monstrous contrivances, there were some that arose from the rivalry of the inventors and their partisans. The *London Mechanics' Magazine* was violent against Macerone, and he was excessive in his ridicule of Ogle. Gurney was opposed, at last, by the *Magazine*, because some of his friends wished to do for him more than they would do for other inventors. It is not unlikely that if all these inventors had been united in one company, they might have prevailed on the Lords to pass the bill which the Commons had passed, to repeal the prohibitory tolls; and it is probable that their united talents would have produced a better carriage than any separately could produce. On this point Gordon remarks: "That so many attempts should have proved abortive, and that so few should have been successful, is no wonder, when it is remembered that almost every patentee or projector endeavored to work independently of his contemporaries in the same field. If one has had an improvement in the boiler, he has refused to look at another's experience in the general arrangement. If this inventor has improved the mode of propulsion, he lightly esteems the advantage of that one who has arranged a regular draft for the fire. A disposition to work independently has been the ruin of numerous projectors, and the sickener of those whose funds were for a time at their disposal. * * * There are distinguished mechanics, acknowledged philosophers, and eminent engineers, all falling short of Gurney, Hancock, and Macerone. Many of them exhibited beauty of arrangement in minor details, but nothing more; and the public mind being always impressed by the majority, the labors of such men have

encouraged the belief that there are insurmountable physical difficulties which still remain. * * * That successful builders will detail their process for doing so, we can not expect. Building may be their business hereafter; and their hard apprenticeship will but little dispose them to publish the secrets of their craft."

The vulgar saying, that opposition is the life of business, was never more forcibly refuted than in this case. All the force of the friends of this enterprise was required to defend it against the landed interest, the bigoted road-trustees, the jockeys, and the egotists who wish to put down all that can detract from their own importance; and for years after the invention is revived, it will be desirable that all the talent and all the capital should be combined in one company, which company should not be committed to any one invention, but should liberally aid all inventions, and adopt all that is best.

One would hardly think that the railroad should be forced into the ranks of the enemies of steam-carriages. While the railroad lasts, flat roads must be used; for a railroad can not go to every door. The common road is the railroad's feeder; and the question is, can we make it more efficient by putting upon it a power that has made the railroad successful? Where great speed is allowable, the railroad may be the best; but where six or eight miles an hour is all that is allowable, and stops must be frequent, a flat and smooth surface, of iron or stone, is better, because it will accommodate all kinds of traffic, permit frequent stops, and go to every door without the trouble of transhipment. In a city and its suburbs it is expedient to devote all the money to one system—to put into the pavement all that is now expended for pavement and rails. We should then have a traction easier than that of the grooved rail, with the dirt in it; and we should have cleanliness, which can never come with stone pavements and horse-power; and all this for a purpose to which the rail is but imperfectly applicable. But, in spite of all this, there are men who, because rails are the best on long lines, jump to the conclusion that they are best in all cases, and say that steam without rails is not advantageous.

In conclusion: the enemies and lukewarm friends of steam-carriages are unwilling to rely on "theory," or the deductions of reason, for proof as to their economy. Why, then, do they make adverse *assertions*, which tend to prevent experiments from being tried? But facts, well attested, prove that steam-carriages can work with profit. Even the fact that the trustees of roads piled them with broken stone, for the purpose of breaking down steam-carriages, proves that they did not deem them likely to die a natural death, as they soon would have done, if they could not be made profitable.

Since the foregoing was in type, the *Scientific American* has published "a brief history, with some reflections," occupying two columns and a third, of steam-carriage experiments. In the course of this "history" it reïterates its statement that the carriages which ran between Glasgow and Paisley failed, and attempts to show that there is no truth in the statement that the road was encumbered with broken stone. Its argument is as follows: "By another law no stones could be placed on the road by the trustees of more than one cubic inch in size. * * * And had the steam work been broken down, as has been asserted, those who placed the obstructions would have been hanged or sent to a penal colony." Moreover, it says: "We have been informed by one that these coaches were 'Gordon's,' by another that they were made by Robert Napier, while a third says they were built by that excel-

lent engineer, Scott Russell. It makes no matter who was the builder, nor whether they run in '33 or '34; the name and date are of very little consequence; the fact is the main point, and that is not denied."

The fact is, indeed, the main point, which I have been trying these two years to get at. But while this paper withheld the name and date I could not identify it. I now take this as an admission that I was right in supposing that they were Russell's carriages, and ran in '34. Whether the name and date are of consequence, may be seen by the following extracts. But first I will remark that the law limiting the size of broken stones to one inch is no proof as to the number of cart-loads that were laid down.

The following extracts are from the *London Mechanics' Magazine*, 1834, Vol. 21, pp. 270, 288, 304, 352:

MR. RUSSELL'S STEAM-CARRIAGES.

"Through the medium of a letter from Glasgow, we are happy to record the great and increasing success of these carriages. Our friend writes, that having recommenced their regular business career on Wednesday morning, they ran throughout the day with the utmost punctuality. The speed may be judged from the following statement sent us:

1st carriage,	No. 4,	30 minutes.		4th carriage,	No. 3,	46 minutes.	
2d "	No. 4,	34 "		5th "	No. 1,	25 "	
3d "	No. 3,	45 "		6th "	No. 1,	25 "	

The distance here taken is from Tradeston, Glasgow, to the Tontine Inn, Paisley; for although the carriages start from George's Square, they are not put to their speed until they get clear of the crowded streets; but as this distance is at least seven miles, the rate attained by the last vehicle, which, we understand, contains the latest improvements, is not much less than 17 miles per hour. Another circumstance we are glad to hear was, that, so highly have the public already begun to appreciate this new mode of conveyance, the carriages were overloaded with passengers the whole day. We observe, however, that the trustees of the Glasgow and Paisley road are by no means favorable to the undertaking, and have been for this week past busying themselves in laying down immense heaps of stones on all the ascents and *best* portions of the road, for the apparent purpose of obstructing the progress of the carriages, though hitherto without effect. This conduct, as might have been expected, is meeting with the general indignation of the people in that quarter."—*Edinburgh Observer.*

"We have much pleasure in noticing the last two days' most successful performance of the steam-carriages. On Wednesday they made six trips, and yesterday an equal number. They were crowded with passengers; and so great was the anxiety to obtain seats, that although there is accommodation for 26, it was impossible to prevent upward of 30 from taking seats upon them. The average velocity is 12 miles an hour; and the only impediment to a high rate lies in the extraordinary state of the road, which should at this moment be in the best condition, but has just been deeply bedded with broken stone, laid on in large masses, for the purpose of injuring the carriages. This is a line of illiberal policy which it is hoped the trustees will not persevere in, as it can not affect the success of the carriages, which will assuredly be carried through with advantage, while the road is thereby rendered unfit for general traffic, at a great expense to a public trust. At the sixth trip on Wednesday last, as the steamer was coming up to the new

metal, it was found that enormous heaps of stones had just been laid down; and the tremendous power requisite to pass to it smashed one of the wheels, and detained the carriage till it was replaced."—*Glasgow Courier, July* 1.

"On Friday evening last, a highly interesting experiment was made to ascertain the comparative merits of two of the company's steam-carriages, upon different constructions. A little after six, they left George's Square, with a supply of fuel and water for eight miles. They proceeded together through the crowded streets, as rapidly as safety would admit, and along the Paisley road, to a point a little beyond the Two-Mile House, where they turned and started together. After keeping exactly together for a quarter of a mile, the one on the improved construction began to show a manifest superiority, and rapidly distanced the other, and on arriving at the Gorbals had gained half a mile, having done the whole distance in 7½ minutes, while the latter required ten minutes."—*Glasgow Herald.*

"On Wednesday, the steam-carriages commenced running every hour with passengers and luggage; and they have since been plying with most triumphant success. They start from George's Square a little before the hour; and, proceeding down Queen street, take up passengers at the foot of it; and, starting from the head of Maxwell street, they pass through Tradeston, where they again take up passengers. This occupies twelve or fifteen minutes; and the seven miles to Paisley are done in 30 or 35 minutes. A few minutes are thus left to take in fuel and water, with the passengers, at Paisley; and at the succeeding hour the carriage returns to Glasgow.

We noticed on Tuesday the *kindness* with which the road-trustees at the Glasgow end had accommodated Mr. Russell's carriages, at their own expense, (or that of the public,) with a sufficient quantity of new metal to try their powers; but we have since discovered that this *kindly disposition* has been carried a little too far, and that, having found the carriages more than competent to the task of ploughing through the stratum of broken stones, previously laid down, they employed a large number of men on the following day to lay down another stratum of equal thickness, on the top of the former, rendering the road scarcely passable to any heavy load. Finding this expedient also ineffectual, we learned yesterday that horses and carts and a number of men had been engaged during the whole of the night in laying down loads of broken stones to such a depth that they were obliged to cut away the bottom of the toll-gate to allow it to close over the mass."—*Glasgow Courier of July* 4.

"Mr. Russell's carriages have continued to perform their trips with increasing success. The following is the running of the last three days, from the Tontine, in Paisley, to Tradeston, Glasgow:

	To Paisley.	To Glasgow.
Thursday, July 17.—10	o'clock, 40 minutes.	11 o'clock, 48 minutes.
12	" 58 "	1 " 38 "
2	" 56 "	3 " 59 "

Friday, July 18th, the times were: 44, 45, 35, 39, 45, 43 minutes.
Saturday, July 19th, the times were: 34, 33, 32, 35, 55, 44 minutes.
We have only further to remark, that on the last two trips the anxiety to get places was so great that the carriage took out 28 passengers and returned with 39."—*Glasgow Herald, July* 21.

"THREE MORE DAYS' RUNNING OF RUSSELL'S STEAM-CARRIAGES.—Monday, July 21.—Times: 50, 35, 41, 33, 46, 59 minutes. Tuesday, 22d.—Times: 50, 40, 49, 52, 39, 36 minutes. Wednesday, 23d.—Times: 35, 34, 37, 36, 59, 37 minutes.

The carriage that left Glasgow yesterday at twelve, did the distance from the Half-way House to Paisley, fully three and a half miles, in ten minutes, being at the rate of 21 miles an hour!"—*Glasgow Courier, July* 24.

"One of Mr. Russell's steam-carriages between Glasgow and Paisley having been over-set by the breaking of a wheel, the boiler burst, and five persons were killed. The Court of Sessions has, in consequence of this, interdicted the whole set of carriages from running, for the present at least. A fine specimen this of Caledonian wisdom! Why do they not clear the Clyde of all its steamers, since certain it is that steamboats have met with accidents as well as steam-carriages, and are as likely to meet with them again? It is impossible so absurd an interdict can stand."—*London Mechanics' Magazine, August* 3.

[We make no apology for occupying so much space with this subject, for we consider it one of the practical questions of the day. Steam-carriages are to be running on our common roads, ere long, we firmly believe. If steam is cheaper than horse-power, and so much cheaper as to warrant the immense outlay for railroads, why will it not pay without this expense? The only difficulty appears to be in arranging the machinery so as to have it perfectly under control. In fact, the steam-carriages would now be in operation in England, in our judgment, had not a combination of hostile influences driven them off the ground.—EDS. P., L., AND A.]

DILATATION OF CAST-IRON BY SUCCESSIVE HEATINGS.

TRANSLATED FROM LE TECHNOLOGISTE, MAY, 1854.

THE Memoirs of the *Société Industrielle de Hanovre* contain on this subject a short note, which we here present to our readers:

"The remarkable phenomenon that cast-iron presents after being heated, of not returning, on cooling, to its original dimensions, but of presenting constantly an increase of this volume, and, by consecutive heatings and coolings, of acquiring a permanent volume, larger and larger, was first observed by Prinsep, in 1829. This chemist found that a retort of cast-iron, of which the capacity had been measured with care by the weight of mercury it contained, gave the following results. Before ever being heated, the retort contained 9.13 cubic inches of mercury; after the first heating and cooling, the contents was increased to 9.64 cubic inches; and after three successive heatings to the fusing point of silver, the contents was 10.16 cubic inches. The cubic dilatation produced then was 11.28 per cent, or a lineal dilatation of nearly 3.73 per 100. Since this, there has been occasion to observe more frequently, and to investigate this property of cast-iron. It has been remarked, in effect, that all grate-bars which sustained a high heat became curved, little by little, that they elongated more and more, until finally they would push out the bars that sustained them.

M. P. W. Brix, in a work he has recently published, entitled *Researches on the Calorific Power of the Principal Combustibles found in Prussia*, has made known some experiments on this subject. By the aid of numerous measurements,

he has found that its permanent length augments after a heating, but that this augmentation was so much the less as the bar had been heated more often, and finally ceased. Thus, a grate-bar of 3.5 feet in length, after three days of a moderate fire, had taken a permanent elongation of 3-16 of an inch, (equal to 0.446 per cent;) at the end of 17 days, this elongation was 7-16 of an inch, (1.042 per cent,) and at the end of 30 days had reached 13-16 of an inch, (nearly 2 per cent,) and did not yet appear to have attained its maximum. Another bar of the same kind, after a long service, had preserved a permanent elongation of 1.25 inches, or nearly 3 per cent. The bars, while in the fire, experience another elongation, which is temporary, and contract as the heat is diminished; and it may hence be concluded with M. Brix, that it is proper to give to each new bar a play, longitudinally, of about 1-25 of an inch, or 4 per cent, to allow for this permanent and temporary elongation. In all cases, it is necessary to make it long enough, that when cold it may not fall between the supports, but in general it seems that not sufficient play is given to bars supported in this manner."

NOTE BY TRANSLATOR.—This is a matter very important to be thought of in all cases where cast-iron is submitted to the action of high heat, as furnaces, retorts, boilers, etc., and especially in cases where cast-iron may be riveted or fastened to boiler-iron or other metals. In such cases, the cast-iron, in expanding permanently more than the other metal, will give the surface a curved form, and tend to break the rivets, or other parts of the construction, and in certain circumstances might be productive of very inconvenient results. This is very plain to any practical man.

Where the cast-iron part of an engine is riveted to the boiler, as is often the case, the attachments should be made, as far as possible, at places not submitted to great changes of temperature; but if this condition can not be fulfilled, make the attachments in a manner to obviate, as far as possible, the evil referred to. This remark is made, not only with regard to the permanent elongation the cast-iron undergoes, but also with regard to the different degrees of expansion experienced by cast and wrought-iron or other metals, by the same increase of temperature. The effects of this are soon noticed in the loosening of joints, warping of surfaces, etc. The intelligent builder, with a knowledge of these facts and their extent, can, by the simple laws of common-sense, arrange his work properly.

These effects may be noticed in almost every place where cast-iron is submitted to high heats, in retorts, furnaces, etc.: the shoving out of bricks, the pushing aside of supports, and neighboring parts, etc.

EMPLOYMENT OF QUICK-LIME IN HIGH FURNACES INSTEAD OF LIME-STONE.

BY C. MONTEFIOR LEVI AND DR. EMIL SCHMIDT.

FROM experiments made at the iron-works of Ongrée, near Liege, these gentlemen found that to produce 100 kilogrammes (220 pounds) of pig-iron, the average consumption of coke for six months of 28 days, when lime-stone was used, was 160½ kilos., (353 pounds,) while with burned lime the consumption was only 146½ kilos. (322 pounds,) being a saving of 8.88 per cent. The average production for 28 days, with lime-stone, was 461,000

kilos., and with burned lime, 735,000 kilos., or an increase of 24.3 per cent. Corresponding results were obtained with another furnace worked three months with lime-stone and three with burned lime. The average coke consumed per 100 kilos. with the former being 162, and with the latter 147¼ kilos. The production of iron per month being on an average 469,000 with lime-stone, and 563,000 with lime. The furnaces at Ongrée have now been working 3½ years with lime, with the same result, the saving per year, notwithstanding the cost of first having to burn the lime, being 30,000 francs per furnace. The same process has been successfully tried in some parts of Wales and in England.—*Edinburgh Phil. Journal.*

THEORY OF IRON SMELTING.

A BLAST furnace consists of two columns, one of air, ascending from below upward, and the other of solids, thrown in from above and descending. At the top, the amount of watery vapor is 9 to 14 per cent. But the vapor in the gases rapidly diminishes. At the top the gases are, nitrogen, 57·79: carbonic oxide, 23·51; carbonic acid, 12·88; hydrogen, 5·82. At between eight and seventeen feet from the top, the carbonic acid and hydrogen diminish, and the water completely disappears. The oxygen of the air is first changed into carbonic acid, and then, by the coal, into carbonic oxide. The hydrogen is produced by the vapor of the water, which is decomposed by carbon into hydrogen and carbonic oxide. As the column of gas ascends, the carbonic oxide diminishes, and the carbonic acid increases—a change produced by the action of carbonic oxide upon sesquioxide of iron, which yields carbonic acid and metallic iron. It seems remarkable that hydrogen should exist in contact with sesquioxide of iron, at a red heat, without deoxidizing it; but it has been shown that an electric spark, passed through carbonic oxide, oxygen, and hydrogen, produces carbonic acid, while hydrogen remains. Between the neck of the furnace and the boshes the minerals lose their moisture, and the oxide of iron $\frac{2}{3}\frac{3}{3}$ of its oxygen to the deoxidizing power of carbonic oxide, while the $\frac{5}{3}\frac{3}{3}$ remaining are removed between the boshes and tweens by the carbon of the coal. At a foot above the tweens, the temperature diminishes, and to this the line of fusion is limited, and here the change of carbonic acid into carbonic oxide is complete.

COMPOSITION OF THE GASES IN IRON FURNACES.

Depth from the top in feet.....	5	8	11	14	17	23	24	34
Nitrogen	55·35	54·77	52·57	50·95	55·49	58·28	56·75	58·08
Carbonic acid.....	7·77	9·42	9·41	9·10	12·43	8·19	10·08	—
Carbonic oxide	25·97	20·24	23·16	19·32	18·77	29·97	25·19	37·43
Carbonic hydrogen.....	3·75	8·23	4·57	6·64	4·31	1·64	2·33	—
Hydrogen	6·73	6·49	9·33	12·42	7·62	4·92	5·65	3·18
Olefiant gas.....	0·43	0·85	0·95	1·57	1·38	—	—	—
Cyanogen.....	—	—	—	—	—	trace.	trace.	1·34

The occurrence of cyanogen is interesting, although its formation had been long ago pointed out. When an iron tube was introduced through a hole two feet nine inches above the hearth, a gas passed out, burning with a yellow flame, similar to that occurring during the preparation of potassium. The tube was soon obstructed by cyanide of potassium. The cyanogen is produced by the nitrogen of the air or coal, while the potassium is derived from the

potash of the coal, (.07 per cent,) and from the iron ore, (.75 per cent.) amounting to 270 lbs. in twenty-four hours. The cyanide of potassium is volatilized, and is decomposed by the air into carbonate of potash and cyanide, which is gradually decomposed as it ascends. That the cyanogen is not altogether decomposed is, however, proved by the results obtained at Coltness iron works, where, in saving the waste gases for the purpose of calcining the ore, a considerable quantity of alkali, containing cyanide of potassium and carbonate of potash, is sublimed in the common furnace at the summit. The amount of alkaline salts sublimed may be about two and a half tons per furnace during the year.—*Ex.*

CINCINNATI AND CHARLESTON RAILWAY.

The Kentucky Legislature has granted a liberal charter to the Kentucky Union Railway Company, whose object it is to make the last link in the railway line from Cincinnati to Charleston. The distance by the route adopted will be as follows:

Cincinnati to Danville, - - - -	132 miles.
Danville to Knoxville, - - - - -	130 "
Knoxville to Charleston, via Blue Ridge Railroad,	370 "
Aggregate, - - - -	632 miles.

"We doubt," says the *Cincinnati Railroad Record*, "whether any railway in America will ever be of such vast importance as one which shall connect the Valley of the Ohio with the Southern Atlantic on the most direct route. The productions of the different sections are totally different; the habits and usages of the people are different. The interior country, reached from either end, is full of the most valuable mineral resources, and thus all the exchanges would be beneficial, both in a commercial and moral aspect. It is now nearly twenty years since this subject engaged the profound attention of the people of Cincinnati, Charleston, and all the intermediate country. We have before us the pamphlets and letters published and written at that time. They exhibit the proceedings of various public bodies, and the records of many distinguished men, now commemorated by history. Among them were Gen. Harrison and Dr. Drake of this city, and Gen. Hayne and Col. Blanding of Charleston.

Time has only proved what was then said of the great importance of this work, and rendered its necessity to the country more apparent.

The completion of this grand route, from Charleston to Cincinnati is now entirely within reach. From Cincinnati to Danville is nearly completed. From Charleston to Anderson, South-Carolina, is finished. The Blue Ridge Railroad from Anderson to Knoxville, via the Rabun Gap, is secured by the ample aid South-Carolina and Tennessee have given to the work. From Knoxville to the Kentucky State line is secured by the State aid and county subscriptions. The line covered by the Kentucky Union Railway charter is, therefore, the only one wanting. By its connection with other roads, and the immense through-traffic which must inevitably take place, the stock of the road will undoubtedly be good, notwithstanding the sparseness of the country through which it passes.

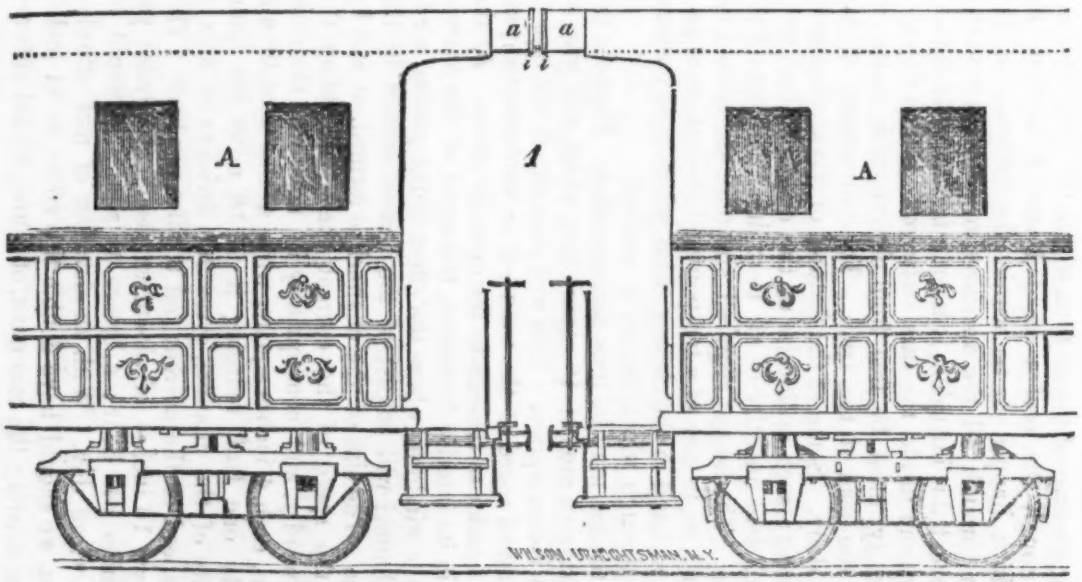
There is no enterprise in which the merchants and capitalists of Cincinnati have a deeper interest than in this, and we trust it will meet with the encouragement which it so eminently deserves."

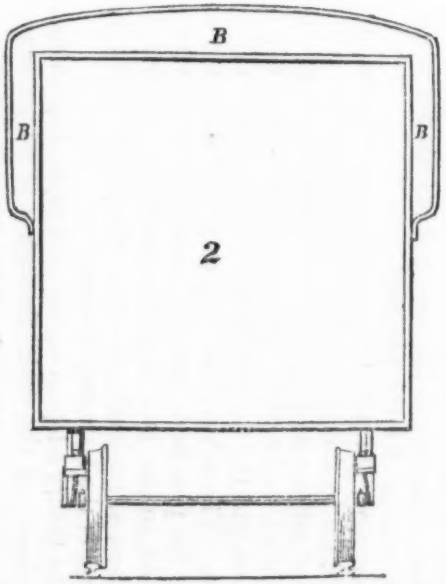
THE improvement, of which the above cut is a representation, consists of a spacious air-channel over the entire top of every car of the railway train, and also down over the sides, so far as to include in the same channel the windows of the passenger-cars, with glazing opposite each. The channel is made continuous from car to car by movable extensions of the roof part of the channel from each end, along with, and beyond the roof of every car, to meet those of adjoining cars.

A, fig. 1, indicates secondary walls erected over the usual primary ones to form the channel B, in the transverse section fig. 2 at an interval of one or two feet or more for the roof part, and for the side, three to six inches. The side-channels are closed at each end and terminate below, near the bottom of the windows. The side-channels are omitted on the baggage-cars.

The chief movable piece adapted to self-adjustment, and to play over the platform, is the same at each end of every passenger-car, and consists of the short piece of channel, *a*, fig. 4, with one or more springs, E, upon its inner end and the face-flange *i*, surrounding its outer end. A valve-door, D, is hinged from above, inside the flange, closing by its own weight the channel at the latter end of the train. The valve-doors at the end of every other passenger-car are opened inward by the hinged pin *h*, meeting the opposite flange on uniting the train. Baggage-cars are without valves.

The flanges are used to give the separate channel-ends suitable meeting-faces to be held together by the springs, but to move freely upon each other in the variations of their level, and also to preserve the channel itself unbroken by such movements. The springs rest





against bearings provided within, to which they are also fastened, and the balance of the whole piece is preserved by the weight of the semicircle *s*, attached thereto. The sides being rounded, it will always fill the lined cavity between the upper and lower roofs, while turning either way on curves of the road, as well as reciprocate by the action of the springs.

Fig. 1 exhibits this single movable piece in two adjacent car-ends. But to give greater stability, when desirable, this channel-piece, as in fig. 3, is inserted in another piece, C, having the central pivots *c* above and below; this latter has only the turn-table motion, the other the reciprocating.

In the general view of a train on a curve, with this improvement attached, heading the above cut, the appearance of these together may be observed.

The motion of the train passes the pure air through the channel from the head of the train, into the interior of the passenger cars, by way of the inner windows, at the option of those who sit opposite, which thence forms a current outward through every opening, effectually repelling the dust. Smoke and cinders are left behind the channel's mouth, before their descent.

In the construction of new cars, compactness and economy may be gained by locating the main channels between the inner and outer casings of the cars, in which case a valve-slat, or shutter in the casing of the window recess, governs the admission of air, instead of inner windows.

From the foregoing description, illustrated by the figures in the cut, it is believed the process of ventilation by this plan will be fully understood. The earnest and careful attention of railway managers, car manufacturers, and men of science, is respectfully invited to the philosophical principles involved, in the exclusion of dust from cars, and the practicability of the proposed method of putting them in operation. The subject has long engrossed the attention of the inventor, who believes the plan here presented combines the provisions necessary to exclude the dust, smoke, and cinders, a profusion of pure air, economy of expense, and those self-adjusting features which will render any attention from those in charge of the train superfluous.

It will be observed that the theory adopted is, that the rapid displacement of the air caused by the passage of the train through it at a high rate of speed raises the dust, and the friction and eddy resulting cause it, by the suction toward the centre of the eddy, to envelop the rear of the train; and there being no corresponding pressure of the air from within the cars, *outward*, but owing to the waste through the roof a decided suction *inward*, the dust, smoke, and cinders which happen to be within the influence of this eddying current, are drawn through all the apertures or crevices into the interior of the cars. To prevent this intrusion, it is only necessary to oppose an equal pressure of the air from inside the cars *outward*. But as this air, in order to remove the difficulty, must be free from objectionable matter, it is necessary to take it from the head of the train. The correctness of this theory it is believed few will deny. Some of the features of this arrangement must be decided by experiment; such as the size of the channel which may be necessary to convey a sufficient quantity of air to exclude the dust effectually from the longest trains. The largest required size once ascertained, all may be uniformly constructed, as, in case of a too powerful current, each passenger has his own remedy at hand in the closing of his window, or decreasing the size of the aperture through which the air is received.

The efficiency of the ventilation may be thus demonstrated. Suppose the entrance of the channel to have an area of 10 square feet, which will give us 90 divisions of area, each 4 inches square. This will pass air at the rate of 32 miles per hour—the assumed speed of the train—if an unobstructed passage is formed through the interior of the cars to the open air above. As the channel becomes enlarged in its interior formation, the speed of the current will be diminished, and at the windows, where the effect of the passing air is required for coolness, the channel will consist of the spaces opened by the raised windows of the train. The size of the channel so formed, at and by the windows, will govern the speed of the current there. Doubling the capacity of the channel inwardly, and consequently its area, will therefore give us 180 divisions of area, each 4 inches square, while at the same time it will take from the velocity one half, reducing it to 16 miles per hour. Doubling again the capacity of the channel, gives 360 divisions of area, 4 inches square, leaving the speed of the current but 8 miles per hour. This would give to 360 windows 16 inches of air-current each, at 8 miles per hour, or 32 inches at 4 miles per hour; a breeze as strong as would be agreeable, if constant, in a warm day. With an elevation of roof allowing an entrance of 20 feet area, we should have double this effect, or 64 inches each window. The air after entering the cars must, of course, be led outward

through a sufficient number of ventilating chimneys of the usual construction, unless better modes shall be prepared for its escape.

The inventor is aware that so many methods of ridding the travelling public of the insufferable nuisance of dust have been proposed, most or all of which have failed to answer the desired purpose, that the attempt to form such a combination as will steer clear of all objections and provide a healthy and pure atmosphere to breathe, without adding the least inconvenience to the present mode of travel, may be deemed a bold if not a rash undertaking—an improbable if not impossible achievement. Having full faith, however, in the correctness of the views which have guided him from the conception to the maturity of his plan, he places it before the public with the utmost confidence that practical experiments will establish the complete success of this mode of ventilation. Experience teaches us that many things which were long considered impossible or even visionary, have been lately accomplished by human invention, and it may not, perhaps, be too great a tax upon the credulity of some to believe in the success of this.

The practicability of the invention having been decided upon, the next question presenting itself is one of expense. Most people would say this latter is of no consequence at all, where health and comfort are so directly concerned. And there is little doubt that the increase of travel which would result from the extinction of this annoyance from dust, would refund the cost many fold. It will be seen that the chief expense of applying this mode of ventilation to new cars will consist in the cost of the movable extension-pieces which make the channel continuous; while the application of it to cars already constructed would only involve a secondary roof and outer walls, extending down so as to include the windows. The expense attending either of these modes of application is comparatively trifling.

The inventor, Mr. Cyrus Lancaster, of Brooklyn, N. Y., has secured his right to this improvement by application to the Commissioner for Letters Patent. As the adoption of this plan of ventilation, immediately its success is demonstrated upon all the great routes of travel, especially where competition exists, is deemed almost certain as a means of retaining a share of the public patronage, it is submitted that manufacturers of cars would do well to give it their consideration, with a view of obtaining a right to incorporate it in cars of their construction at the earliest practicable moment

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ON THE EMPLOY OF SAL AMMONIAC TO PREVENT INCRUSTATIONS IN STEAM-BOILERS.

TRANSLATED FROM LE TECHNOLOGISTE, MAY, 1854.

THE Memoirs of the *Société Royale des Ingenieurs Hollandais* contain two reports on this subject, which we have caused to be translated into French, on account of the interest the question presents at present.

Report of M. de Bries Robbé.—The employ of sal ammoniac to prevent incrustations in steam-boilers, or to make them disappear, has been proposed by M. H. Ritterbrandt, and since has drawn the attention of M. Conrad, Director of the Corps of Engineers in Holland. It is to him that are due the experiments in question: "The experiments which have been tried on locomotives on the railways in Holland, have demonstrated that it is an

excellent means to detach and dissolve the calcareous incrustations of boilers, and dispose of them so far that the boilers may be completely rid of them. To prove this, there was introduced 60 grammes (a French gramme is the 1-1000th part of a kilogramme, or 2.2 pounds) of sal ammoniac in powder into a boiler, immediately after being filled with water. This was left until the evening of the next day, after the locomotive had done its service. The boiler being found not dirty, it was run still another day, at the end of which it was emptied, and the boiler appeared perfectly clean. The water taken out was generally, in proportion to the calcareous matters contained in the boiler, a solution more or less saturated witn sal ammoniac and lime, which amounted to 1-800 the weight of the solution. Later, there were formed paillettes of lime, which easily passed off by the discharge-cocks. After the boiler had thus been, during fifteen days or a month, purged of incrustations, it sufficed to introduce once or twice per week 60 grammes of the salt, to keep it entirely clean. A more attentive examination showed that the water, after one or two days of service, did not give a single trace of iron or copper in solution.

"It is certain, then, that the quantity of salt indicated can not in the least shorten the duration of the boiler, (the writer here refers to the effect on the boiler and tubes which might be suspected to take place by the decomposition of the sal ammoniac, sulphate of ammonia,) and consequent disengagement of free sulphuric acid, but, on the contrary, may augment that of the fire-box and tubes, by preventing destructive incrustations; and it also decreases the quantity of combustion, as the incrustations are very bad conductors of heat. Again, the decreased quantity of fuel used tends of course to make the boiler last longer. It is probable that the sal ammoniac, in combining with the lime, forms chlorhydrate of lime, and that by this combination the ammonia is set free; at least this is what is conjectured by the odor of the steam. The sal ammoniac, in powder, costs about 3 francs per kilogramme."

Report of M. C. Scheffer.—"At the commencement of the year 1847, experiments were undertaken on the steam-boiler at the royal saw-manufactory of Rotterdam, with sal ammoniac, to ascertain to what point they could succeed by this means to prevent the injurious effects of incrustations on the sides of this boiler. This boiler is low-pressure, the tension of the steam being scarcely 1-10th of an atmosphere above the ordinary atmospheric pressure, and puts in movement a machine of 16-horse power, of Mandslay's. The water employed is that of the Meuse, which, according to the analysis of M. Muller, contains much calcareous matter. From the 26th March there were introduced, three times a week, 100 grammes of sal ammoniac into this boiler, after having been cleaned of all previous incrustations. Four months afterward, I submitted to an examination the sides of this boiler, and I found a tolerably regular accumulation of incrustations on the vertical sides, while above the furnace this crust was much less. Its thickness was evidently less everywhere than usual, and nevertheless, during all this period, it had been heated on the average 14 hours per day. The boiler was cleaned anew, and about 45 pounds of incrustations removed. I at once commenced a new trial, and as I did not know exactly the proportion of salt necessary to completely prevent the evil, I resolved to double the former trial, and to use 200 grammes, which was thrown twice a week into the boiler. After more than five months of work, there were still some incrustations, and principally, as in the first trial, on the vertical sides; but the experiments go to show that, by the use of this salt, incrustations may be very much diminished, and perhaps totally prevented, and it is of great importance to pursue these experiments further."

ELECTROTYPING.

The following is the process for covering a piece of metal with the substances named. The directions are as given by Dr. Gore:

To Coat Articles of Copper, Brass, or German Silver with Aluminium.—Take equal measures of sulphuric acid and water, or take one measure each of sulphuric and hydrochloric acid and two measures of water; add to the water a small quantity of pipe-clay, in the proportion of five or ten grains by weight to every ounce by measure of water, ($\frac{1}{4}$ or $\frac{1}{2}$ oz. to the pint,) rub the clay with the water until the two are perfectly mixed, then add the acid to the clay solution and boil the mixture in a covered glass vessel one hour. Allow the liquid to settle, take the clear supernatant solution, while hot, and immerse in it an earthen porous cell, containing a mixture of one measure of sulphuric acid and ten measures of water, together with a rod or plate of amalgamated zinc; take a small Smee's battery of three or four pairs of plates connected together, intensity fashion, and connect its positive pole by a wire with the piece of zinc in the porous cell. Having perfectly cleaned the surface of the article to be coated, connect it by a wire with the negative pole of the battery and immerse it in the hot clay solution; immediately abundance of gas will be evolved from the whole of the immersed surface of the article, and in a few minutes, if the size of the article is adapted to the quantity of the current of electricity passing through it, a fine white deposit of aluminium will appear all over its surface. It may then be taken out, washed quickly in clean water, and wiped dry and polished; but if a thicker coating is required, it must be taken out when the deposit becomes dull in appearance, washed, dried, polished, and reïmmersed; and this must be repeated at intervals, as often as it becomes dull, until the required thickness is obtained. With small articles it is not absolutely necessary, either in this or the following process, that a separate battery be employed, as the article to be coated may be connected by a wire with the piece of zinc in the porous cell, and immersed in the outer liquid, when it will receive a deposit, but more slowly than when a battery is employed.

To Coat Articles with Silicium.—Take the following preparations: three quarters of an ounce, by measure, of hydrofluoric acid, a quarter of an ounce of hydrochloric acid, and 40 or 50 grains, either of precipitated silica or of fine white sand—the former dissolves more purely—and boil the whole together a few minutes until no more silica is dissolved. Use this solution exactly in the same manner as the clay solution, and a fine white deposit of metallic silicium will be obtained, provided the size of the article is adapted to the quantity of the electric current; common red sand, or indeed any kind of silicious stone finely powdered, may be used in place of the white sand, and with equal success, if it be previously boiled in hydrochloric acid, to remove the red oxide of iron or other impurities. Both in depositing aluminium and silicium, it is necessary to well saturate the acid with the solid ingredients by boiling, otherwise very little deposit of metal will be obtained.

The Largest Church in Europe is at St. Petersburg. It was begun in 1771, and in twenty years two thousand men had not finished the walls. It is of polished marble, both outside and in; the pillars are of one piece, fifty feet high, the base and capitals of solid silver; but the greatest curiosity of all is a wooden box, constructed to cover it from the weather.

THE MINERAL RESOURCES OF VIRGINIA AND NORTH-CAROLINA.

THE following is the work of Samuel M. Dewey, a public-spirited citizen of Virginia:

List of valuable and interesting Minerals, including some of the principal ranges of Rocks, known to abound in the counties of Henry, Patrick, Carroll, and Floyd, in Virginia; and in Rockingham, Stokes, Forsyth, Surrey, and Yadkin, in North-Carolina: a Section of the Piedmont Country, embracing the Northern Head-waters of the Great Yadkin, and all the Tributaries of Dan River.

1. IRON ORE of every desirable species or kind, apparently boundless in quantity; beds or veins of one or more valuable varieties existing in each o the above-named counties, all of which, except Carroll, Henry, and Forsyth, having yielded ores that have been successfully converted into iron of the best quality.

2. COAL.—Anthracite, or Stone Coal, in Rockingham and Stokes, approaching nearly or quite to the line of Henry county, if it does not pass to that section of Virginia; the Fossil Coal is of excellent quality, and to all appearance is exhaustless as regards quantity.

3. LIMESTONE.—Primitive, Granular Limestone, or the finest quality of White, Gray, Mottled, and other colored Marble; there being seven quarries in Stokes, three in Forsyth, two in Yadkin; beside an extensive range of impure Linestone in the counties of Stokes and Forsyth; a single range or bed of the same in Patrick; and several quarries of secondary Limestone in Rockingham, some of the latter being Hydraulic Limestone, while others are of the most beautiful and valuable qualities of Granular, Black, Variegated Marble, superior to any other known to be found in the United States.

4. LEAD ORE—In Carroll, Floyd, Stokes, and Surrey.

5. COPPER ORE—In Patrick, Carroll, Floyd, Forsyth, and Surrey.

6. GOLD.—There have been recently discovered three auriferous deposits in Patrick, one in Carroll, three in Stokes, four in Forsyth, three in Surrey, and four in Yadkin; making eighteen gold deposit mines, each of them being believed to be traceable to veins that have not been sufficiently penetrated or tested to be pronounced workable, or rich enough to justify their being worked.

7. MANGANESE.—Three beds in Patrick, one in Carroll, one in Henry, two in Forsyth, and one in Surrey.

8. PLUMBAGO, or BLACK LEAD, occurs repeatedly in Patrick, Stokes, Forsyth, Surrey, Yadkin, and Rockingham.

9. NATIVE ALUM exists in several parts of Patrick and Stokes.

10. SALTPETRE exists in Patrick, Henry, Floyd, Stokes, and Surrey.

11. FIRE-BRICK CLAY—In Patrick, Stokes, Surrey, and Rockingham.

12. PORCELAIN CLAY—In Stokes and Surrey.

13. POTTERS' CLAY—In Forsyth, and throughout the other counties.

14. PURE WHITE TALC, OR CRUDE FRENCH CHALK—In Surrey—there being an extensive range of impure Talc in Patrick, and also one in Carroll.

15. ITACOLUMITE, or perfectly fire-proof Elastic Sandstone, in Stokes.

16. BRONZE-COLORED, SATIN-LUSTRED SERPENTINE—In Stokes and Forsyth.

17. VARIEGATED AND OTHER VALUABLE KINDS OF STEALITE OR SOAP STONE, in Patrick, Carroll, Floyd, Stokes, Forsyth, Surrey, and Yadkin.

18. Primitive Sandstones, suitable for a variety of purposes, such as grindstones and whetstones, in Patrick, Carroll, Stokes, and Surrey.

19. Secondary Sandstones, suitable for grindstones and whetstones, in Henry, Rockingham, and Stokes.

20. Mill-Stone Grit, in Patrick, Henry, Stokes, and Rockingham.

21. Burr-Stone, in Floyd, Stokes, Surrey, and Forsyth.

22. Jasper, of many varieties, including the Opal, Striped, Yellow, Red, Brown, and other hues—some of them being drusy, or incrusted with minute Quartz Crystals—also Botryoidal and Mammillated concretions, in four parts of Stokes.

23. Calcedony, of all tints and colors, embracing the Wax-lustred, the Milky or White Cornelian, Rose-colored, Blue, Pink, Honey, Yellow, Sard, etc., with Mammillated and Botryoidal concretions, also the Druse, in nine sections of Stokes and one of Forsyth.

24. Agates.—Mossy, Yellow, Scarlet, Green, and Gold-colored, with waving lines, etc., in two parts of Stokes.

25. Garnets, in Carroll, Patrick, Stokes, and Forsyth.

26. Black Schist, or Tourmaline, in Henry, Patrick, Carroll, Stokes, Forsyth, and Surrey.

27. Yellow Tourmaline, in Yadkin.

28. Stalactitic Quartz, with Jasper base, in Stokes.

29. Hornstone, of Honey, Yellow, Claret, and other colors, in Stokes.

30. Amethystic Quartz, Crystals, in Henry and Forsyth.

31. Limpid, Corrugated, Yellow, and Pink-colored, Auricular, Pyramidical, and Prismatic-shaped Quartz Crystals, in Henry, Forsyth, Patrick, Carroll, Floyd, Rockingham, Stokes, Surrey, and Yadkin.

32. Actinolite, or Cotton-Stone, in Floyd, Stokes, Surrey, Yadkin, and Forsyth.

33. Tabular Druse Quartz, in Forsyth and Yadkin.

34. Silicious Petrifactions, in Stokes and Rockingham, constituting a vast range of petrified trees, or parts of trees, some of them measuring nine feet in circumference, and some that were evidently more or less decayed, previous to undergoing the process of petrifaction, contain clusters of Quartz Crystals. This remarkable body of fossil curiosities extends from Germantown, in Stokes, to Leaksville, in Rockingham, a distance of about twenty-five miles, and fully merits the name of Petrified Forest.

FOR THE PLOUGH, THE LOOM, AND THE ANVIL.

OBSERVATIONS ON THE DROUTH IN LAMOILLE COUNTY.

Messrs. Editors: In Lamoille County we have a large portion of alluvial, sandy plain, which in dry seasons does not produce well, especially grass, which is a very essential crop in this high latitude. The earth has not been saturated with water since May. The 8th June we had several fine showers; since that time we have had four showers that wet down about one inch; none to exceed two; several sprinklers, to the amount of a heavy dew.

The corn-leaves began to roll the 6th July; the 16th the grass in our pastures would crumple under our feet, and was as dead as in April. Not more than one third of our corn-stalks is furnished with ears, the lower leaves are

dead, and many are now cutting it up and feeding it to their cattle. Potatoes, not one third of a crop, selling for 75 cents the bushel; hay is selling at $10 the ton, never before, at *this* season of the year, over $6, and frequently at $4. I have resided in this town fifty-six years; it never has been as dry before since my living here. In describing this extreme dryness, I confine my remarks to our sandy plains; the crops are better on the back, moist lands, but *they* suffer very much. Three weeks since, the hop-growers had despaired of a crop, on which is placed great dependence, the bottom leaves being dead up the poles quite a distance; within that time two showers have fallen, that wet down about an inch each, and the hop has matured wonderfully. The wells and small streams are many of them dry, and springs fail that never were known to before. It is not unfrequent for people to fetch their water for culinary purposes half a mile, and drive their animals thus far for water.

The shade-trees planted by the way-side, or before dwellings, one year since, and leafed out luxuriantly last spring, many of them are now dead; the maple-trees before my house, ten inches in diameter, planted thirty years ago. the leaves are falling, and many of those on the trees look as if scorched by fire.

A high cranberry in my garden has been planted more than twenty years, and its berries are shrivelled and dry; the apples and plums are falling from the trees in abundance; even raspberries and blackberries have failed. The heat has been very oppressive, the thermometer, ranging, from 12 to 2 o'clock, at from 80° to 98°, many days in succession. The temperature of the nights has been unsteady, very warm, and cool, ranging at sunrise from 68° to 40°, and this morning, Aug. 18th, 36°, the coolest since May. The barometer, for some ten weeks, has stood much of the time at 29.40, no time lower than 29.20.

That great pest in dry seasons, the grasshopper, is destroying every green thing. The leaves of the potato-vine, in many places, are all eaten off, and the silk of the corn is eaten to the cob, to the great detriment of the *little* expected from that indispensable crop; the wheat and oats are suffering from the depredations of this little unwelcome parasite.

Food for cattle is so short, as soon as the hay is taken off the stock is turned into the mow-fields, and they are pressing their claims for food and drink, and breaking into the inclosures on every hand.

Were the whole country in our predicament, a famine would be the result; wheat is not to be bought; flour, $11 the barrel; oats, 62½ cents per bushel; corn, $1.25 per bushel; potatoes, 75 cents per bushel; butter, 20 cents per pound, and other articles in proportion.

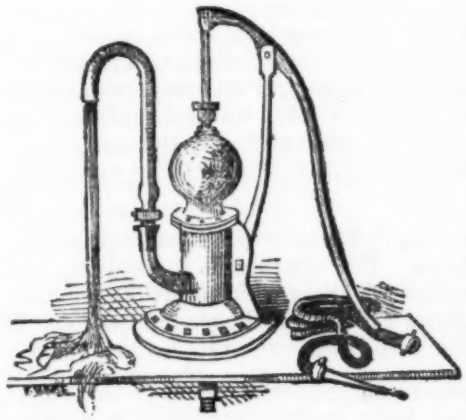
In addition to all our other woes, this morning, Aug. 18th, I discovered the rust, or rot, had attacked the potato-vines.

The drouth is very extensive, but not as severe usually elsewhere as in our county. Signs of rain are abundant, but the clouds will break and disperse without rain; the wind, for more than eight weeks has been, a great share of the time, in the south A.M., at M., and until 2 o'clock, west, at night north-west.

Your *Plough* cuts a wide furrow. I have received letters in relation to the cultivation of hops from Georgia and from Alabama, the writers of which had noticed my address in your journal. ARIEL HUNTON.

Hyde-Park, August 18, 1854.

EDITORS' JOTTINGS AND MECHANICAL RECORD.



STREVER'S DOUBLE-ACTING FORCE-PUMPS.—This pump draws and discharges an equal stream of water, and is well adapted for all situations requiring large or small quantities of water, namely: mines, breweries, railroad water-stations, tan-works, paper-mills, steam-engines, plantations, steam-boats, ships, irrigating land, dwelling-houses, wells of any depth, etc., etc. There are five different sizes, capable of discharging from 25 to 300 gallons per minute, and can be worked by hand, horse, water, or steam-power, and being compact, require but little space, and not liable to get out of order. They are said to give great satisfaction for mining purposes.

Beside pumps of all sizes, Mr. S. has on hand, and furnishes to order, at his warehouse, 170 Broadway, all sizes of wrought and cast-iron, lead, copper, block-tin, and gutta-percha pipes, leather and India-rubber hose, couplings, branch-pipes, and every article requisite for hydraulic purposes.

FALL-RIVER ROUTE TO BOSTON.—We have again had most substantial evidence of the merits of this favorite route. The "Bay State," Capt. Brown; Mr. Stickney, clerk, and that important personage, the cook, and all hands, are just what they should be, to do justice to owners and passengers; and the "Empire State," its commander, Captain Brayton, and Mr. Symons, clerk, suffer nothing by comparison, and the table of the latter, among all boats we have sailed in, is equalled only by that of the former. The state-rooms in both are convenient, the beds good and clean, and the servants throughout attentive. This route gives you but fifty miles in the cars, and an entire night's rest. Mr. Borden, 70 West street, is the agent.

WRONG LOCATION: CLOTHING-STORE.—In speaking of Lippincott & Co.'s extensive clothing-store in Philadelphia, recently, we located it on the wrong corner. It is on the south-west corner of Fourth and Market streets, and may be easily distinguished as being the only red store in the neighborhood. Lippincott & Co. are now laying in their fall and winter stock of ready-made garments, manufactured in their usual good and durable style, and we would again call the attention of purchasers to their excellent assortment.

NEW-YORK & ERIE RAILROAD.—It is a long time—more than a year—since we have had the pleasure of passing over this road. Then our old friend, Charles Minot, Esq., occupied the place which is now filled by D. C. McCullam, Esq., the present superintendent. We hear the "administration" of this latter gentleman spoken of favorably. Common fame says that the trains run with great regularity, and that the *breeze* which recently sprung up between the superintendent and the engineers has really purified the atmosphere, and redounds to the credit of Mr. McCullam. The N. Y. & Erie Railroad is a great work, and no man can pass over it without being deeply impressed with a sense of the enterprise and perseverance of those who projected and completed it. Who has not heard of the powerful locomotives, the wide cars, and the broad gauge of the Erie Railroad? A thousand, yea a million tongues, proclaim its importance to the travelling public, and trumpet its fame over the civilized world. Long may it merit the glorious things which are now spoken of it!

CAMDEN & AMBOY RAILROAD.—This company is constantly making improvements having reference to the comfort and convenience of the travelling public. Recently several hundred feet of depot-buildings have been erected at Amboy, and a large shed at the foot of Walnut street, Philadelphia, appropriately divided into passage-ways for the passengers and baggage-crates. Curves in the road are being straightened, and other improvements taking place, greatly promoting the facilities and comforts of travelling. As seven trains a day are now run, varying in fares from one dollar and fifty cents to three dollars, and in time from three and a half to six hours, the wishes of the passenger are met, both as regards time and means. The enterprising agents, Messrs. Bliss and Gatzmer, the former of New-York, and the latter of Philadelphia, are entitled to the many compliments paid them by the travelling community, for the excellent management which characterizes the road.

PIANO-FORTES.—We have had in our family for some time past, a piano manufactured by Hallett, Davis & Co., Boston. The instrument is excellent in tone and workmanship, and those of our readers who may wish an article that can be relied upon, can not do better than give a call on the house in question. The firm are gentlemanly, upright men, who will endeavor to merit a second call.

RAILROAD REGULATIONS.—The President and Superintendent of the Philadelphia, Wilmington & Baltimore Railroad, have recently published a volume of rules and regulations for the government of those connected with the road. It is especially worthy of notice from two considerations: First, from the care manifested throughout to secure regularity and safety as well as speed. Secondly, it is the first work of the kind we recollect to have seen in *book form*. It is handsomely printed on good paper, in large type, neatly bound, and properly classified and arranged. A copy is to be presented to each employée in the service of the company, and the manner in which it is got up will cause it to be preserved and read. We were much pleased to see in it a rule prohibiting the use of intoxicating drinks by those in the company's employ. There is no doubt that nearly all the "accidents," so called, are traceable to this worst foe of man. The road in question has always been free from those catastrophes so common on some roads, and it is evidently the purpose of its able officers, Mr. Felton, president, and Mr. Spafford, superintendent, to keep it so. A strict observance of these rules will accomplish so desirable an end.

HARLEM RAILROAD.—John D. Elliot, Esq., has succeeded Mr. Sloat as superintendent of this road. It has always been one of the best managed in the country, and has more trains pass over the southern part of it than any other road in the world. Accidents are very rare, and have always been traceable to the imprudence of the victims themselves. The company is now running two trains a day between New-York and Albany, leaving New-York at 7.39 A.M. and 2.45 P.M., and Albany at 5 A.M. and 3.45 P.M. It passes through the rich agricultural counties of Westchester, Putnam, Duchess, Columbia, and Rensselaer, affording the passenger a view of the most pleasing and interesting objects, over its entire length. The cars are convenient and handsome, the conductors gentlemanly and courteous, and the speed such as to meet the wishes of any reasonable man. Should the reader be passing between these two cities, let him by all means give the Harlem Railroad a trial.

NEW DRAWBRIDGE SIGNAL.—We were recently shown a drawbridge signal, invented by Simeon L. Spafford, Esq., Superintendent of the Philadelphia, Wilmington, & Baltimore Railroad. It was the model which we inspected, although the signal itself is in use at every bridge on the above road. Its merits consist in its always showing the proper colors on four sides, and on being so constructed that it can not be easily misplaced. It is above the draw, in the centre, and exhibits four sides, or a lantern which can be seen at a great distance. Its operation is simple yet effectual, and we shall not be surprised to see it come into universal use. Mr. Spafford has taken the necessary steps for obtaining a patent for it, and will be glad to communicate with parties wishing to adopt it. His post-office address is Philadelphia.

An Improved Piano.—I have hardly space left to allude to a new and remarkable invention. It is a contrivance for giving to the piano the only quality it wanted—a prolonged sound. For ten years it has been sought for in vain. It was impossible to make the piano sing, by obtaining from it a sustained note, like the human voice or the violin. Thalberg's great merit, beside his unrivalled execution, was his manner of at least approaching, upon the piano, the "sostenuto," indispensable in many kinds of music. The invention is very simple, and it is efficient and infallible. The inventor is M. Alexander, the manufacturer of the organ-melodeon, and the first specimen of it is intended for Liszt.—*Paris Letter to the N. Y. Times.*

Light in Dyeing.—An English artisan proposes to employ the chemical agency of light in dyeing or staining textile fabrics; the cloth, whether wool, silk, flax, or cotton, being first steeped in a suitable solution, then dried in the dark, and subsequently exposed to the action of light, those parts which are to form the pattern being protected by pieces of darkened paper, or some other suitable material, fastened to a piece of glass. When the desired effect is produced, the time for which varies from two to twenty minutes, the fabric has to be removed, in order to undergo a fixing operation, while a fresh portion of it is exposed to light.

Pennsylvania Railroad Tunnel.—The tunnel which has just been completed on the line of the Pennsylvania Central Railroad passes through the summit of the Alleghany Mountains at a point known as Sugar-Run Gap. It lies in the counties of Blair and Cambria—the summit being the dividing line. It is 3612 feet long, 2685 feet of which is arched, containing 7700 perches of cut stone and 6400 perches of brick masonry, and 927 feet is cut through the solid rock where arching is unnecessary. Eight feet of the arch on each side is built of cut stone 22½ inches thick, resting on abutments of rock-range work of the same thickness, and the crown consists of five courses of hard-burnt brick—the whole laid with hydraulic cement. At grade, the width of the tunnel in the clear is 21 feet—ten feet above the grade, 24 feet. The height above the grade is 23 feet. The greatest elevation above tide is at the west end of the tunnel where the height is 2161 feet. The grades ascending the eastern slope commence at Altona, and in a distance of 12 miles, where the west end of the tunnel commences, the height overcome is 993 feet, or 82¾ to the mile.

The Minerals of Tennessee.—East-Tennessee, as we learn from the *Knoxville Whig*, is three hundred miles in length by one hundred in width, and embraces within its limits thirty counties. From Marion county to the county of Anderson, and beyond that for the distance of two hundred miles, stone coal, iron ore, lead, and other valuable minerals abound in profusion. This region is watered by the Tennessee and Clinch rivers, which are navigable for steamboats during nine months of the year. In Anderson, Campbell, Claiborne, and Hawkins counties, salt, coal, and iron exist in abundance. On the south side of the Holstein river, discoveries are made daily of iron, lead, silver, copper, and coal. In Polk county twelve copper-mines are in operation, most of which produce ore (so says our contemporary) of a quality richer than the mines of Lake Superior. For this ore $170 per ton is realized. The cost of transportation to New-York is $21.50. The copper business is the most profitable in that section. During the month of April four of these mines shipped six hundred tons of ore, equivalent in value to $102,000.

New Manufactory of Agricultural Implements.—David Landreth, of the farm and garden seed store, 23 South Sixth street, Philadelphia, has commenced the manufacture of agricultural implements by steam, at Bristol, Pa. His warehouse is in Philadelphia, at his seed-store.

Clement's Live-Stock Agency.—Aaron Clement, who conducts a live-stock agency in South street, Philadelphia, has recently sold a number of cattle, sheep, poultry, etc., etc., to Hon. John Wentworth, of Illinois, better known as "Long John." Mr. Wentworth has purchased a large tract of land near Chicago, which he is stocking in the best manner from Mr. Clement's agency.

SUBLIMELY RIDICULOUS: GEORGIA AND OHIO BABY-SHOWS.—If any are disposed to bring annual agricultural fairs into utter contempt, no better or more rapid process can be devised, in our opinion, than by the baby-shows of some of our friends in Georgia and Ohio. If they can not excite an interest in their fairs by any better means, they had better renounce them altogether.

If they really profess to be in earnest on this subject, they had better go into it business-fashion, and detail all the peculiar conditions of both parents, *in et ab initio*, and the peculiar habits of each, which may be supposed to aid in the happy result; and as it is supposed that surrounding scenes and persons viewed by the mother during certain periods have an effect on the quality of her offspring, we ought to know whether the scenery viewed by the candidate was beautiful or not, and whether her associates were handsome or lively, or graceful, etc., etc. Go into these matters physiologically and psychologically, or leave them for other professions. Whether the mother wore stays or not, would be quite an interesting question to — some. Whether she ate meat or saw-dust; whether she habitually took exercise, etc., etc. We will furnish a list of inquiries for investigation whenever requested by the proper authorities.

In addition to the criticisms copied below, we would respectfully beg leave to inquire whether the weight of the father, or mother, or both, should not be taken into the account. Is not the one hundred-pound mother who produces a ten-pound baby as meritorious as a hundred and fifty-pound mother who *grows* one of twelve pounds? But we forbear. The *subject* grows on our hands. Now for the extracts:

But we are moved to these remarks by noticing the following, from the *American Agriculturist*, which is also commented upon in the paragraphs appended thereto in the *Louisville Journal*.

"A GREAT BABY-SHOW: *What constitutes the Prettiest Baby?*—The Stark County (Ohio) Agricultural Society are offering premiums for the finest specimens of Young Americans. Here is the list:

For prettiest baby, $5 and diploma to mother; for 2d prettiest baby, $3 and diploma to mother; for 3d prettiest baby, $2 and diploma to mother; for largest and heaviest child, under twelve months old, age to be considered, $5 and diploma to mother; for 2d largest and heaviest child, under twelve months old, age to be considered, $3 and diploma to mother; for third largest and heaviest child, under twelve months old, age to be considered, $2 and diploma to mother.

The above is not a fair list; all the rewards go to the mother—no encouragement to fathers.

Before this exhibition comes off, the above Society ought to define what constitutes the 'prettiest baby;' otherwise exhibitors will be altogether in the dark as to what they are to show for; whether fat, or lean, or fair condition; black, blue, or gray eyes; black, brown, flaxen, red, or auburn hair; pale or rosy cheeks; small or large feet and hands; long or short in the neck and body; thick or thin through the chest; round or square shoulders, etc.

All the above matters should be laid down in a 'Scale of Points,' on the same principle as established by the New-York State Agricultural Society, in judging of improved stock at their annual exhibition. It would be well also to have this 'Scale of Points' accompanied by a 'model baby,' chiseled in marble for the form, and with a painted ditto for color, etc.; then the committee would have some basis on which to found their judgments, and we might look forward to some improvement in the breed of the *genus homo* quite as sanguinely as we do now for that of the lower grades of animals; and Heaven knows that there is need enough of that in this wicked world, degenerate as it is, morally and mentally as well as physically.

If a satisfactory 'Scale of Points' and 'models' could be adopted by the agricultural societies in these matters, the conducting editors of this journal might be tempted to make an entry for premiums, as each has been blessed the past month with what they consider a pair of 'models' of the first order.

We copy the above from the *American Agriculturist*. We fully concur in the editor's suggestions.

We most heartily congratulate our friends of the *American* upon those cheer-

ing events of the past month, particularly the *senior*. To be thus blessed at this period of his days is a blessing indeed, and one which inspires *us* with hope, hope even in our declining years.

We believe to Springfield, Mass., belongs the honor of first introducing baby-shows; but the Southern Central Agricultural Association of Georgia entirely eclipse our Ohio neighbors in their scale of premiums. The following are among the premiums to be awarded at their next fair the coming fall:

1st Premium.—Silver pitcher, $50, for the handsomest and finest babe two years old.

2d Premium.—Silver pitcher, $25, for the handsomest and finest babe one year old.

3d Premium.—Silver goblet, 10, for the handsomest and finest babe six months old.

The children to be clothed in domestic fabrics; the premiums to be awarded under the direction of the executive committee.

Georgia! yes, Georgia—it's a great country, and the Georgians are a great people. We have a friend who was born in Georgia, and who is a day's journey around the middle and three feet around the leg—he's married, too, but alas! has no babies. No doubt if he had, his would come in ahead for the first prize.

We hope these shows of young live-stock of the *genus homo* will prosper, until finally we shall have a grand National Baby Fair; then let all creation stand back for Old Kentuck. We have the authority of a friend for saying that Bourbon County, for a union of fat and beauty, can beat all the world and the rest of mankind. We expect, in view of this interesting show, a great matrimonial stampede. It is not expected that the exhibition will come off for a couple of years yet, and *candidates need not be in a hurry—there will be plenty of time to prepare.*"

Oblique Railroad Wheels.—The Paris correspondent of the *New-York Daily Times* says:

"One of the most interesting sights in Paris, and one that no American ever thinks of visiting, as he probably never heard of it, is the railroad from the Barrier d'Enfer to Sceaux. It is but seven miles long, and was built as an experiment upon a new system of wheels. The engine, tender, and hindermost car of the train are furnished with oblique wheels, under the ordinary upright ones. Where the track is straight, these do not touch the rails; but at the curves they come into play, rattling along the inner edge of the rails, and preventing the train from running off the track. The road was therefore made purposely tortuous, and the most sudden and seemingly dangerous bends were introduced at frequent intervals. The two stations are circular, and the train, as it receives its passengers, is doubled up into a ring of 50 feet radius. The smallest curve upon the road is 68 feet radius, and over this the train goes at full speed. The corners of the cars are cut off, so that the vehicles, in following the curves, do not infringe upon each other. Sceaux is upon an eminence, which the road ascends spirally, with something like a mile of track—it only going, in advance, a hundred feet. The invention—which, by the way, is ten years old—has proved practically very successful; but it has never been applied to any extent."

[We do not see why an invention, which is exhibited in the English department of the Crystal Palace, is not identical with that here described. It may be that the two inventions differ as to the extent of contact with the rail; but we still think them the same. If they are the same, we fully indorse for them. That exhibited at the Palace we consider a capital contrivance. But it costs something, and that is objectionable, while so many roads are constructed on paper securities.—Eds. P., L., and A.]

The Culture of Strawberries.—The New-York Horticultural Society, at a recent conversational meeting, arrived at the following conclusions in regard to the best method of cultivating strawberries:

"The best soil for the strawberry was stated to be a gravelly loam. The land should be well drained, and to every acre applied twenty bushels of unbleached

ashes, ten bushels of lime, and two or three pounds of salt. The ground should be well broken up; animal manures should be eschewed; leaf-mould is the best, and this should be carefully spaded in. About the first of July is the best time to set out the plants. In doing this, pains should be taken to have them firmly rooted. The rows should be eighteen inches apart, and the plants a foot apart. Sometimes it will be well to allow greater interval, in which case the interstices can be filled up from the growth of the runners. After setting out the plants, throw on a covering of tan-bark an inch or an inch and a half in depth, then water them plentifully, and the moisture will be retained a long time. After cold weather comes on, cover the strawberry-beds and the walks with clean straw, throwing over a little brush, or something to keep the straw in its place. In the spring remove the straw and make use of some fertilizing agent to give the plants vigor, as sulphate of soda, sulphate of ammonia, or nitrate of potash. Keep the roots out, see that the plants are bountifully watered, and let nothing intervene to disturb or retard their growth till you gather the fruit. The beds should be made over as often as every three years."

Victoria Bridge.—The work, now fairly commenced, is without exception the grandest work of its kind on this continent. When Stephenson first projected a tubular bridge across the Menai Straits, people shook their heads, and doubted the possibility of accomplishing such a work. When the Britannia bridge was completed, people came from all parts of Europe to inspect the wonderful structure. Steamboat excursionists *via* London and Chester were equally loud in praise of this wonderful work. Up to this very moment, it constitutes, with the Menai Suspension Bridge, one of the great attractions of the district, and the traffic in excursionists alone is immense.

The Victoria Bridge over the St. Lawrence will form a still more grand and important object of attraction, because of its being a far more surprising work of art. Thus the Britannia bridge, thrown from cliff to cliff, has natural ramparts on which to rest. The low shore of the St. Lawrence does not present the same advantages to the engineer which are to be found where the bold cliff of the Island of Anglesea is separated from the equally bold cliff of the Welsh main, by this arm of the sea. To those who have not seen the Britannia bridge, but who have seen the Suspension bridge at Niagara Falls, we may say, that the cliffs at Niagara are not unlike in formation those that border the Menai Straits, so that the tubes rest upon buttresses of solid rock. In the one case, nature has prepared the place to the hand of the engineer; in the other, every thing has to be done by the art and science of the engineer; and yet, in spite of these natural difficulties, the engineer proposes to throw a tubular bridge, two miles long, over this noble river, with a centre arch, one hundred feet high, over the only navigable channel of the river. A more stupendous and noble work could hardly be conceived; and we should be dull observers, if we did not believe that it will, when completed, take its place, and be ranked beside the Tunnel under the River Thames, the Menai Suspension bridge, the Britannia bridge, and other monuments of human ingenuity which are visited by pilgrims from distant lands, as abiding trophies of human genius and labor, and which administer more largely to the prosperity of the localities in which they are placed than those who take a narrow view of the subject could possibly imagine. A few years hence, this very bridge may be one of the greatest attractions to bring the tourist and visitor to Montreal.—*Montreal Herald.*

What our Country pays for Guano.—The *Genesee Farmer* says: The quantity of guano which will be brought to the United States this year will be about 200,000 tons.

Two hundred thousand tons of guano purchased at fifty-five dollars a ton (the present price in New York) will take out of the country eleven million dollars for imported manure. For a comparatively new country, this is a startling fact. All the corn and corn-meal exported in the last fiscal year amounted to less than two and a half million dollars. When will our people see the folly of wasting so much of the elements of crops in almost every rural district, and then sending to the west coast of South-America, for ten million dollars' worth of manure!"

Musical Instruments.—Amid the various manufactures that within a few years have sprung into being in this country and become a permanent branch of American Industry, may be classed the manufacture of instruments of music, especially the Piano-Forte, of which there are now made in the cities of New York and Boston, annually, about 12,000, varying in price from $200 to $1000 each. This gives employment to thousands of industrious mechanics, as well as to thousands of waiting capital, good proof of the increased culture of the art and science of music. At the rate of our present progress, may we not judge that the time will come when poetry will be but half finished without its corresponding musical expression to give utterance to its life and soul? But we commenced this paragraph simply to mention a fact. Having seen by the report of the last Great Fair of the Mechanics' Association in Boston, that the first Premium for the best Square Piano-Forte was awarded to Messrs. Woodward and Brown, of that city, and that the Committee at the last Fair of the Worcester County Society, at Worcester, had awarded the same makers the first premium over all others, we were induced to improve a few leisure moments while in that city a while since, by visiting their establishment. It is one of the best organized and most neatly arranged for easy management that we have ever seen. Messrs. W. and B. are both practical working men, of long experience in all branches of their business, and employ from seventy-five to one hundred hands in connection with the most approved machinery. A toning machine, and a machine for winding their strings, were particularly neat and compact. Their arrangement for stowing cases on rollers, one above the other, to save room, and also their mode of making racks for the piano tops, is worthy of imitation by makers doing even a small business.

When all manufacturers of these and other instruments shall make similar efforts to produce the highest mechanical and acoustic results, we shall get rid of thousands of jarring and unharmonious wire boxes which are not only a waste of lumber but a positive nuisance in many a town and village.

A New Mowing Machine.—Mr. Fisk Russel, of Boston, a practical mechanic of large experience, has invented a mowing machine which differs in several particulars, both in principle and construction, from those now in successful operation, and decided advantages are claimed for it. The driving-wheel is the same as in Ketchum's; but the vibratory motion is obtained from a wheel consisting of a series of cams, by the undulating rim of which a lever is made to move the knives. The knives are each separate, and play upon a steel pivot, acting as they vibrate like a pair of shears. The frame of the machine is supported by a second wheel of the same size and attached to the driving wheel, which renders the movement of the machine more steady, and obviates, in a great measure, the side draught.

The machine was tried last week on the farm of B. B. Kirtland, of Greenbush, and did its work admirably. There was no clogging, and apparently less power was required to operate it than other machines. It is simple in its construction, and works with very little friction. Mr. Russel intends to devote the remainder of the hay season to experiment with perfecting his machine, and it will not be offered for sale till another year. Any judgment as to the superiority of the machine would be premature until further trial has been made, but it certainly promises to be a valuable labor-saving implement.—*Boston Cultivator.*

Testing Marbles.—A Washington letter-writer states that in the basement of the Smithsonian Institute there is a room where marbles are scientifically tested. Specimens from all parts of the world may be seen there, cut into squares and cubes. To prove their strength they are tested in a crushing machine. That which is brought from Lee, Mass., is said to be the strongest and best in the country for building purposes. But the marble is not tested by pressure alone. They try it also by acids, by water, by drying, etc. They have scales to weigh the crystals in, which are so delicate that ten thousand of its smallest weights are required to make an ounce. The index-tablet, for telling the weight is so fine that its movement has to be examined by a very powerful microscope, to discover the variations.

How to Clean Animals and Plants of Vermin.—The *Agriculture* publishes a letter from M. Raspail, giving an account of a plan for destroying vermin on animals, and also on trees and plants. The process he recommends is to make a solution of aloes, (one gramme of that gum to a litre of water,) and by means of a long brush to wash over the trunks and branches of trees with this solution, which will speedily, he says, destroy all the vermin on them, and effectually prevent others from approaching. In order to clean sheep, or animals with long hair, they must either be bathed with this solution, or be well washed with it. The writer mentions several trials which he made of the solution with the most complete success, and very strongly recommends it to general use.—*London Advertiser.*

North-Western Pomological Convention.—The next annual meeting of this Association will be held at Burlington, Iowa, commencing on the last Tuesday (the 26th) of September, at 10 o'clock A.M., and continuing four days. Communications on any or all branches of horticulture are solicited, which, together with any boxes of specimens, may be directed to the "N. W. Pomological Convention, care of Messrs. Avery, Burlington, Iowa."

By order. F. K. Phœnix, *Cor. Sec.*

New Printing Press.—Mr. Stephen Brown, of Syracuse, has invented an ingenious press for printing four different colors simultaneously. The Syracuse *Journal* says of it: "The inking apparatus, and the principles of the machine, are so arranged that four different colors can be printed at one impression, at the rate of about five hundred impressions an hour. And not only can different lines and letters be printed in various hues, but so perfect is the invention, that one letter may be printed in two, three, or four colors, or be printed in one color and shaded by another, all with the same impression."

NEW BOOKS.

Fifty Years in Both Hemispheres; or, Reminiscences of the Life of a Former Merchant. By Vincent Nolte, late of New-Orleans. Translated from the French. New-York: Redfield. 1854.

This is a remarkable volume. It gives the details of the life of one engaged in some of the greatest financial operations of the French government in the early part of the present century, including the period of the First Consul, and carried on in France, Germany, England, Spain, and the United States. The largest bankers were agents in these immense transactions. Incidental to these matters, many anecdotes are given of prominent persons in both hemispheres. Whether the author is entirely accurate in his statements we can not say, but his representations do not always agree with those given in more formal history. But whether every statement of fact or of opinion is correct or not, the book has peculiar attractions for all interested in the political and great financial operations, especially at the French court, of the last "fifty years."

History of California, from its Discovery to the Present Time, with a New Map of the Country. By E. S. Capron. Boston: John P. Jewett & Co. Cleveland, Ohio: Jewett, Proctor & Worthington. 356 pp. 12mo. 1854.

This handsome volume is a valuable addition to the works on this subject. It describes the climate, surface, soil, agriculture, commerce, mines, and mining, with an account of its animals, birds, and fishes. The new map is also valuable, and is very handsomely executed. It is by Colton. The description of the voyage from New-York, and the return, will possess interest to some readers.

Gan-Eden; or, Pictures of Cuba. Boston: John P. Jewett & Co. 12mo, 234 pp. 1854.

This, too, is a remarkable specimen of mechanical skill. Few works are so well executed. It is not a history, but a sort of off-hand sketch of the sights and sounds which attract the attention of a traveller in that luxurious island. The style is perhaps a little stately, but the reader will be interested in every chapter, and the knowledge communicated will be quite extensive.

History of Cuba; or, Notes of a Traveller in the Tropics, etc. By Maturin M. Ballou. Illustrated. Boston: Phillips, Sampson & Co. 12mo, 230 pp.

The first three chapters of this volume contain a short sketch of the political history of Cuba. The remainder consists of "the fresh memories" of one who had, for a time, a residence upon the island. The details are somewhat more numerous than those of "Gan-Eden," but, like all original accounts of the same thing, they are alike in many of the incidents, and unlike in the general form of narrative. They nowhere contradict each other on matters of fact, though they differ in opinion as to the practicability of effecting a revolution from without. The monteros, or humbler farmers, seem to be the most contented class.

Lectures on Romanism. By Rev. John Cumming, D.D. Boston: John P. Jewett & Co. 12mo, 728 pp.

These Lectures were first delivered at the Hanover Rooms, in 1850. They have since been "re-cast," "strengthened," and some of them "re-written" by their author, and they now exhibit, most decidedly, the coolest and acutest logic, and the most careful and thorough investigation, in reference to the doctrines of the Catholics and Tractarians, that we have ever seen. He who overthrows the argument of this book, will have no occasion to look for further antagonists on the points here discussed.

Thoughts and Things at Home and Abroad. By Elihu Burritt, with a Memoir by Mary Howitt. Boston: John P. Jewett & Co. 12mo, 364 pp.

This volume consists of a re-print of many of those admirable "thoughts and things" written by Mr. Burritt, and published in various journals in this country and in England. Among these are "Thought-tracks; or, Why I left the Anvil," in which Ezekiel says such capital things. The topics discussed, of course, are various, and some of the author's reforms do not commend themselves to the minds of every body. But every body will here find enough which they will approve, to cover many times the price of the book, and some of the balance may do them no harm.

A. E. Müller's Piano Method. Revised by Julius Knorr. Translated from the German, by G. A. Schmitt. Boston: Oliver Ditson.

We find in this volume the most satisfactory system of piano instruction we have ever seen. Every step is clear, and progress seems inevitable. Long popular in Europe, this work needs but to be known to become equally so in this country. We advise teachers and scholars to examine Müller's Method, confident that such an examination will lead to its adoption.

SUBSTANCE AND SHADOWS; or, Phases of Every-Day Life. By EMMA WELMONT, author of "Uncle Sam's Palace," etc., etc. Boston: John P. Jewett & Co. 1854.

THIS volume consists of a series of stories, entirely disconnected, of various degrees of merit, but none without interest. Together, they form a very entertaining book, well worth the notice of the reader.

SUNNY MEMORIES OF FOREIGN LANDS. By Mrs. HARRIET BEECHER STOWE. Boston Phillips, Sampson & Co. 2 vols. 1854.

THIS book is now too well known to need description. The writer gives the picture of her own bright thoughts and imaginings in her own style, and what that style is the readers of Uncle Tom need not be told. These volumes can not fail to be read with great interest.

THIS, THAT, AND THE OTHER. By ELLEN LOUISE CHANDLER. With Illustrations by Rowse. Boston: Phillips, Sampson & Co. 412 pages, 12mo. 1854.

THE copy before us is the seventh thousand. The verdict of the public is therefore pronounced already, and with good style and good sentiments throughout, such a verdict is next to infallible. The fair author says her "Flowers are the violets of spring, rather than the splendor of summer or the mellow ripeness of autumn." At any rate, they form a very pretty bouquet.

PHOTOGRAPHIC VIEWS OF EGYPT, PAST AND PRESENT. By JOSEPH P. THOMPSON. Boston: John P. Jewett & Co. 1854. 12mo, 358 pages.

THIS volume is partly descriptive and partly historical. The style is smooth, though a little tumid. The whole is no doubt the result of careful reading and judicious observation, and presents a clearer view of that wonderful country than can elsewhere be found in so condensed a form.

AN ART-STUDENT IN MUNICH. By ANNA MARY HOWITT. Boston: Ticknor, Reed & Fields. 12mo, 470 pages. 1854.

THIS book is peculiarly entertaining. The author was occupied in the study of art, in the city of Munich, and here relates with entire freedom her "beautiful and happy experiences." It is admirably done, and while these pages witness a true joy in the heart of the writer, the reader of taste can not fail to be a partaker in that joy. We would emphasize our words, when we say we most cordially commend this book.

THE AMERICAN TEXT BOOK OF PRACTICAL AND SCIENTIFIC AGRICULTURE, intended for the use of Colleges, Schools, and Private Students, as well as for the Practical Farmer, including Analyses by the most Eminent Chemists. By CHARLES FOX, Editor, etc. Detroit: Elwood & Co. 1854. 12mo, 352 pages.

WE have not for a long time examined a book on agriculture with so much pleasure as this. Its plan is new, in a good measure, and is just what we have long felt was wanted, while the statements of matters of fact or of science are carefully expressed.

Each crop, whether grain or fruit, is treated by itself. The proper soil, mode of culture, etc., are stated with due care and detail, while the uses of the different growths, straw, root, etc., are also described, and the enemies to be encountered by each.

Every farmer should own a copy. It is for sale by D. Appleton & Co., of this city.

FRUITS AND FARINACEA, THE PROPER FOOD FOR MAN, ETC. By JOHN SMITH. With notes and illustrations by R. T. TRALL, M.D. From 2d London Edition. New-York: Fowler, Wells, & Co. 12mo, 308 pages. 1854.

WE are no Grahamite, but in belief and practice have always been opposed to the doctrines here enforced. But we must confess ourself more impressed with the argument of this book than with that of all others we have ever read. The author's opinions are presented with remarkable conciseness, the facts and the entire logic of the book are stated with great fairness, and it is often much easier to deny than to disprove his conclusions. Those who agree with the opinions here set forth can not have a better magazine from which to draw their weapons of attack or defense.

List of Patents Issued

FROM JULY 3 TO AUGUST 8.

Geo. B. Hartson, of New-York, for improvement in making wrought-iron car-wheels.

Charles M. Guild, Brooklyn, for gas-heating apparatus.

Elisha French, Braintree, Mass., for coal-sifter.

Martin V. B. Darling, Providence, for improved slide-valve motion of steam-engines.

C. W. Crozier, Knoxville, Tenn., for improvement in camphor wash mixtures.

Collins B. Brown, Upper Alton, Ill., for improvement in harvester-rakes.

C. F. Brown, Warren, R. I., for improved implement for blasting rocks.

John B. Wickersham, New-York, for improvement in foundation for pavements.

John M. Thompson, Taunton, for improvement in parallel motion for beam-engines.

J. B. Smith, Milwaukee, for machine for mortising sash-stiles.

Gustavus Runge, Philadelphia, for improvement in trap-doors.

David Rankin, Augusta county, Va., for method of applying water to compound buckets of flutter-wheels.

Robert G. Pine, Newark, for improvement in plating metals.

Charles F. Packard, Greenwich, Conn., for improved sawing-machine.

Wm. McCord, of Sing Sing, for improvement in horse-powers.

A. Mayer, Philadelphia, for improvement in gas-stoves.

H. L. Lipman, Philadelphia, for improvement in eyelet-machines.

A. Lyon, Worcester, for improvement in lightning-rods.

S. Hunt, Baltimore, for improvement in apparatus for detaching harness from horses.

Hiram W. Hayden, Waterbury, Conn., for improvement in ornamenting metallic buttons.

Jonathan Ball, New-York, for improved mode of connecting water-pipes.

H. Crosby and Seth E. Crosby, Gustavus, Ohio, for improved mode of arranging arch-boards for cistern-arches.

James A. Cutting, Boston, for improvement in photographic pictures on glass.

General F. Foote, Buffalo, for improvement in ventilating railroad cars.

H. P. Gengember, Alleghany City, for improved cement of boiled coal-tar and earths.

Robert T. Fry, Spring-Garden, Pa., for improvement in the construction of inkstands.

Rufus Porter, Washington, for chair-cane.

J. Rabbeth, East-Hartford, for improvement in diaper-pins.

Thos. B. Smith, Truine, Tenn., for improvement in cow-catchers.

Franklin G. Smith, Columbia, Tenn., for improvement in condensers for steam-engines.

Josiah M. Smith, New-York, for improvement in machines for planing stone and metals.

Willett Thompson, New-Haven, Conn., for ship-ventilator.

Wm. H. Fullerton, Louisville, for improvement in machines for hackling corn-husks.

George Wright, New-England Village, Mass., for improvement in self-acting mules for spinning.

Peter Sweeney, Buffalo, for hot-air furnaces.

Washington Spangler, Harper's Ferry, assignor to himself, Edmund H. Chambers, and Wm. F. Wilson, of same place, for improvement in augers, gimlets, etc.

Thomas W. Gillett, New-Haven, assignor to J. Mathews, of New-York, for improvement in apparatus for corking bottles.

John W. Brewer, Cincinnati, for improved arrangement for mooring and managing balloons.

Ann G. V. McKinstry, Washington, administratrix and executrix of Wm. McKinstry, deceased, late of same place, for improved adjustable bearings for circular saws.

Eden A. Baldwin, second, administrator of the estate of Eden Baldwin, deceased, late of Templeton, Mass., for improvement in fire-arms.

Geo. A. Leighton, Boston, assignor to Nehemiah Hunt, of same place, for improvement in sewing-machines.

Thos. Clegg, Andover, assignor to himself and Nathaniel Stevens, of same place, for improvement in machines for making wire heddle-eyes.

Wm. J. Casselman, Vernon Village, New-York, assignor to Elias A. Swan, of New-York, for improvement in machines for carving marble, stone, etc.

A. G. Gallahue, New-York, for improvement in machines for pegging boots and shoes.

Russell D. Bartlett, Bangor, for machine for making the heads of shovel-handles.

Andrew Lanergan, Boston, Mass., for improvement in lanterns.

Chas. Mettam, New-York, for improvement in construction of iron houses.

Joseph J. Martin, New-York, for improved grapple for raising sunken vessels.

Henry Outcalt, Wilmington, Ohio, for improved mode of constructing metallic-roofing.

Wm. Loughridge, Weverton, Md., for improved arrangement of means for freeing canal-boats from water.

Wm. Lowe, Hartford, for improvement in operating cut-off valves of steam-engines.

James C. Kennedy, Albany, for elevated oven.

Abel Greenleaf, Kingston, Pa., for improved impact water-wheel.

Joel Green, Cincinnati, for improvement in apparatus for sealing cans.

Robert W. Genung, Blooming-Grove, N. Y., for improvement in lifting-jacks.

Wm. P. Chadwick, Edgartown, for improvement in oil or blubber-presses.

Stillman A. Clemens, Springfield, Mass., for improved valvular arrangements for diaphragm pumps.

Alfred Burwell, Rochester, for improvement in machines for stretching shoes, etc.

Adolph Brown and Felix Brown, New-York, for improvement in hat-shapers.

F. B. Smith, Craigsville, N. Y., for improvement in lifting-jacks.

Albert S. Southworth and Josiah J. Hawes, Boston, for improvement in taking daguerreotypes for stereoscopes.

R. H. St. John, Columbus, Ohio, for improvement in bedstead-fastenings.

Willis Straw, Daltan, N. H., for improved chain-hook.

George B. Snow, Buffalo, for improved mode of ringing bells by steam.

Jabez C. Berry, Springfield, Mass., for improvement in screw-wrenches.

Thomas B. Woodward, Kensington, Pa., for improvement in mills for grinding.

Moses D. Wells, Morgantown, Va., for improvement in brakes for light vehicles.

Wm. E. Ward, Port Chester, for improved mode of manufacturing slats for window-blinds.

John Stouffer, Peter Brough, and John W. Barr, of Chambersburg, for improvement in flouring and bolting.

Orrin W. Fiske, Dedham, for improvement in machinery for making pasteboard.

Jacob J. Hatcher, Philadelphia, for improved pen and pencil-case.

Matthew Walker, Sr., Philadelphia, assignor to M. Walker & Sons, of the same place, for improved iron picket-fence.

William E. Bird, of Cahawba, Ala., for improved steam-boiler.

Israel T. Brown, Columbus, Ga., for improvement in cotton-gin ribs.

Leander W. Boyton, South-Coventry, Conn., for improvement in machines for preparing blocks for felting.

Hugh Burgess, Kentish-Town, Eng., for method of coating iron with brass or copper.

Lewis R. Concord, Philadelphia, for improvement in block slide-valves for steam-engines.

Thos. Crossley, Boston, for improved method of making printing-blocks.

Samuel Champion and Thos. Champion, Washington, for improvement in bridge.

Joel A. H. Ellis and Alexander Gordon, Rochester, for improved mode of operating excavating machines.

Jacob Erdle, West-Bloomfield, N. Y., for improved wind-mill.

Roswell Enos, Woodstock, Ill., for improvement in tanning.

Geo. W. Griswall, Carbondale, Pa., for process of separating impalpable powder for paints.

F. Huston, New-Orleans, for improved mode of raising vessels.

Wm. R. Palmer, Elizabeth City, N. C., for improvement in horse-powers.

J. A. Rose and J. Lee, Philadelphia, for improvement in machines for scouring piece-goods. Patented in England, Feb. 17, 1854.

E. Murdock, Albany, for improvement in cutting tobacco.

Wm. G. W. Jaeger, Baltimore, for manufacture of lamp-black.

James Spratt, Cincinnati, for improvement in hermetical sealing.

Thos. Stubblefield, Columbus, Ga., for improvement in steam-gauges.

H. C. Stevens, Georgetown, Ky., for improvement in washing-machines.

Jacob Senneff, Philadelphia, for improvement in sheaver's heddles.

Wm. W. Smith, Marshall, Mich., for improvement in buckles.

A. Snyder, Hawley, Pa., for improvement in railroad car-trucks.

Geo. H. Smith, M.D., Rochester, for improved process for making steel direct from the ore.

Peter Spilman, Richmond, Va., for improvement in apparatus for laying off the scye in cutting garments.

J. F. Snyder, Culpepper, for improvement in metallic fire-places.

S. Tonelison, Pleasant Valley, N.Y., for machines for holding docks of horses.

P. B. Tyler, Springfield, Mass., for improvement in winding rope, cord, or yarn.

Chas. Watt, London, and Hugh Burgess, of the city of London, England, for improvement in the manufacture of paper from wood. Patented in England, Aug. 19, 1853.

Geo. F. Wilson, Providence, and Jas. M. Whitney, North-Providence, N. I., for improvement in machines for threading screws. Patented in England, July 18, 1854.

Mary Burns, of New-York, administratrix of Robert Burns, Jr., deceased, late of New-York aforesaid, for improved carriage-springs for light vehicles. Patented in England, June 7, 1853.

G. J. Wardwell, Andover, Maine, assignor to himself and Elmer Townsend, of Boston, Mass., for improvement in machines for pegging boots and shoes.

Albert H. Tingley, Providence, R. I., assignor to himself, Edmund W., and Harvey F. Tingley, of Providence, aforesaid, for improvement in machines for sawing stone and marble.

Charles R. Fox, Chicago, for improved sawing-machine. Patent dated May 9, 1854.

Samuel Eccles and James Eccles, of Philadelphia, for improvement in looms for weaving figured fabrics. Additional to original letter patent, No. 9168, dated Aug. 3, 1852.

R. D. Bartlett, Bangor, Me., new mode of manufacturing bricks.

W. S. Babcock, Stonington, Conn., for improvement in dumping-wagons.

E. A. Baldwin, Elmira, N.Y., for new tubular bridge.

William Bonny, New-York City, imitation marble.

N. A. Boynton, New-York, new arrangement for air-heating stoves.

J. W. Brown, West-Springfield, Mass., improvement in revolving fire-arms.

Wm. S. Chapman, Cincinnati, Ohio, India-rubber blocks to prevent wear and noise in running carriages.

Nathan Chapman, Mystic River, Conn., improved cotton-press.

Daniel Clare, Hammonsville, Pa., sawing and planing-machine.

Silas Constant, Brooklyn, N. Y., rosin-oil lamps.

Lewis Cutting, Lowell, Mass., stop-motion for speeders.

I. H. Davis, Morristown, N. J., process for making pigments from iron ore.

Joseph C. Day, Hackettstown, N. J., improvement in fire-arms.

G. C. Fisk, Dansville, N. Y., new method of tonguing and grooving boards.

O. N. Frary, Ansonia, Conn., improvement in melodeons.

J. G. Fulton, Middleport, Ohio, salt-packing machine.

John Gemmil, Mercer, Pa., radiators.

Josee Johnson, Fort Smith, Ark., improved brick-press.

Daniel Knight, Salem, Ind., new form of lock for fire-arms.

Wm. H. Merriwether, New-Braunfels, Texas, improved spring for bed-bottoms.

Joshua Merrill and George Patten, Boston, Mass., improved refrigerator for marine-engines.

J. S. McClelland, Jefferson, Ind., new method of arranging buggy-springs.

John McMurtry, Lexington, Ky., improved mode of making brick.

Stanislaus Millett, New-York City, improved sofa-bedstead.

N. Millington and D. S. George, Shaftsbury, Vt., new method of graduating carpenters' squares.

Alex. Moffit, Brownsville, Pa., spring-body car, riage.

Samuel Nicholson, Boston, Mass., new mode of setting and preserving wooden pavement.

J. Porter, New-York city, stone-dressing machine.

Christian Reif, Hartleton, Pa., clover-separator.

Cheeney Reed and Brooks K. Mould, Chicago, Ill., improved method of ventilating railroad-cars.

Luther and Potter G. Ross, Worcester, Mass., machine for cutting boot and shoe-soles.

Horace Smith and B. B. Wesson, Norwich, Conn., improved cartridges.

Ira Smith and John Stonesifer, Boonesboro', Md., improvement in lard-lamps.

T. B. Stout, Keyport, N. J., improved car-coupling.

A. G. Safford, Boston, Mass., sash-spring.

John Thompson, Marblehead, Mass., machine for cutting boot and shoe-soles.

Edward Turner, Baltimore, Md., new hame-fastener.

Philos B. Tyler and Benj. Lathrop, Springfield, Mass., furniture-castors.

Wm. Wickersham, Boston, Mass., self-heating smoothing iron.

Henry E. Woodbury, Washington, D. C., document-file or holder.

Peter Midgett, Hoosick, N. Y., shuttle-guard for power-looms.

Leroy S. White, Chicopee, Mass., improved roller for furniture-castors.

Alfred Swingle, assignor of Elmer Townsend, Boston, Mass., sewing-machine.

John Norton, Cork, Ireland, improved blasting-fuse.

Amos J. Saxton, Brooklyn, N. Y., improved method of constructing iron buildings.

Weatherell Taylor, Camptown, N. J., bushing-sheaves for ship-blocks.

Solomon W. Ruggles assignor of himself and A. R. Smith, Fitchburg, Mass., fan-blower.

Jas. A. Bazin, Canton, Mass., assignor of Alfred B. Ely, Boston, new braiding-machine.

Wm. Ball, Chicopee, Mass., gold-amalgamator.

Solomon Andrews, Perth Amboy, N. J., mail-bag labels.

T. R. and George Bailey, Lockport, N. Y., cutting round-tenons.

H. N. and J. C. Bill, Willimantic, Conn., securing helves in axes, etc.

Wm. Bradley, Lynn, Mass., nutmeg-graters.

E. W. Brown, Fall River, looms.

Henry T. Brown, Brooklyn, N. Y., bottles.

L. B. Carpenter, Buffalo, N. Y., lamp-fastenings.

L. S. Chichester, Brooklyn, N. Y., cotton-gins.

T. F. Chapin, Walpole, N. H., ploughs.

Wm. Clark, New-York, bottles.

John Clark, North-Hadley, Mass., spring and spring-catch for closing doors.

G. A. Colehamer, Reading, Pa., lubricating compound.

Thomas Coles, New-York, omnibus-step protector.

Charles H. Dana, West-Lebanon, N. H., cultivators.

George Deuble, Canton, Ohio, striking part of steeple-clocks.

C. W. Dickinson, Newark, N. J., finishing dies in machine for making rings from sheet-metal.

L. A. Dole, Salem, Ohio, lathe-chuck.

James and John Fishwick, Lexington, Ky., driving and straining saws.

Charles Folsom, Cambridge, Mass., reading-tables.

Alanson Gale, Poughkeepsie, N. Y., mowing-machine.

Samuel Gardiner, New-York, crushing and pulverizing ores, etc.

A. J. Gibson, Clinton, Mass., vehicles.

Ezekiel Gore, Bennington, Vt., butter-workers.

G. W. Griswold, Carbondale, Pa., grates.

E. P. Gaines, Melrose, Texas, mill-stone dress.

B. T. Hall Seneca Falls, N. Y, water-wheel.

A. C. Harig and D. C. Stoy, Louisville, Ky., bank-locks.

M. A. Heath, Providence, R. I., windows.

Walter Hunt, New-York, shirt-collars.

Henry Jackson, Elizabeth, Ohio, steam-boilers.

W. G. Laners, New-York, securing ends of wires in fence-posts.

Griffith Lichtenthaler, Limestoneville, Pa., cultivator.

H. L. Lipman, Philadelphia, eyelet-machines.

N. B. Livingston, Portland, Ind., coupling for carriages.

John Lyon, Harrisburg, Iowa, ditching-ploughs.

Jordan L. Mott, Mott-Haven, N.Y., securing staples to walls.

J. R. Nichols, Haverhill, Mass., soda-water fountain.

Alphonse Quantin, Philadelphia, Pa., stoppering mineral-water bottles.

Washburne Race, (assignor to H. C. Sleby and Washburne Race,) Seneca Falls, N. Y., stove-regulators.

Elihu Ring, Mecklenburgh, N. Y., butter-workers.

Elnathan Sampson, Windsor, Vt., platform-scales.

J. W. Smith, Poultney, Vt., sheet-metal candlestick.

Isaac Straub, Cincinnati, Ohio, corn-cob cutter.

David Stouder, New-Burlington, Ind., ditching-spade.

William H. Towers, Philadelphia, Pa., horse-shoes.

John E. Vansant, Louisville, Ky., indicating-tubes for ascertaining draught of and for trimming vessels.

Abraham Van Antwerp, Albany, N. Y., paddle-wheels.

Charles A. Wakefield, Plainfield, Mass., seed-planters.

Benjamin Webb, Unadilla Forks, N.Y., polishing wheels.

Charles Williams, Fallsburg, Va., fitting heads in boxes.

Simon Willard, Cincinnati, Ohio, portable bedsteads.

Daniel Willis, New-York, apparatus for cooking and warming.

Leonard Woods, Quincy, Ill., hedge-trimmer.

Daniel Zeigler, Lewistown, Pa., cider-mills.

Daniel Wilson, assignor, etc., Milford, N. H., thimbles for stove-pipes.

Birdsill Holly, Seneca Falls, N. Y., mortising-machine.

Thomas Brown, London, Eng., working and stoppering chain-cables.

Elkan Adler, New-York, making matches.

Wm. Little, England, a lubricating material.

C. F. Bauersfield, Cincinnati, Ohio, bits for carving-machines.

C. B. Baker, Troy, N. Y., brick-press.

R. C. Bristol, China, Mich., improvement in steam-boiler tubes.

G. W. Cherry, New-York, stone-saws.

E. and J. R. Cushman, Amherst, Mass., drying hick paper.

Wm. Cayce, Franklin, Tenn., door-locks.

Jer. Carhart, New-York, uniting plates of metal of unequal thickness.

John Carton and Jos. Briggs, Utica, N. Y., hot-air furnaces.

Ari Davis, New-York, magneto-electric machines.

H. C. Deputy, Michigan City, draughting and modelling vessels.

John J. Efferenn, Springfield, Mass., sawing fire wood.

Phineas Emmons, New-York, moulding crackers.

Josiah Eells, Pittsburg, Pa., revolving-breech fire-arms.

John E. Earle, Leicester, Mass., compasses and callipers.

W. K. Glover, Glascow, Ky., metallic pens.

Isaac Gregg, Pittsburg, Pa., brick-presses.

B. F. Gold, New-Haven, Conn., lathing buildings.

A. J. Gibson, Clinton, Mass., attaching thills and poles and whiffle-trees to vehicles.

Joseph Hyde, New-York, washboards

J. M. Hathaway, New-York, shot-pouches.

D. A. Hopkins, Elmira, N. Y., railroad-car couplings.

Wm. F. Ketchum, Buffalo, N. Y., submerged paddle-wheels.

Wm. Henry Morrison and M. W. E. Dorane, Indianopolis, Mich., mortising-machine.

Willis Mansfield, New-Haven, Conn., switch-fenders.

William Watson, New-York, stone and marble-saws.

Benj. F. Bee, feed-water apparatus for steam-boilers.

G. W. Coats and J. Russel, Springfield, Ohio, machines for striking card-teeth.

Halvor Harrison and Horace Barnes, Boston, Mass., measuring cloth on looms.

S. T. Thomas and Eliza Ann Everett, (adm.,) Lawrence, Mass., warping and dressing yarns.

Charles Mounin and W. N. Booth, Buffalo, N.Y., fastening lanterns.

Wm. S. McLean, Pittsburg, Pa., car-wheels.

W. M. Palmer, Palmyra, Me., threshing-machine.

B. S. & C. M. Pierce, New-Bedford, Mass., moulds for cement or earthen vessels.

A. H. Petsch, Charleston, S. C., dumping-car.

Sanford Stone, Kirkersville, Ohio, dumping-cart.

S. Shearman, Goshen, Ind., cleaning and feeding in grain to the mill-stones.

John Stull, Philadelphia, Pa., saw-mills.

Louis Schwingrouber, New-York, shoe-horns.

George Souther, South-Boston, Mass., tires for carriage-wheels.

Eli Whitney, Whitneyville, Conn., fire-arms.

Horace Woodman, Biddeford, Me., cleaning top-cards of carding-machines.

Simeon Willard, Cincinnati, Ohio, bedsteads.

Albin Warth, New-York, fire-engines.

W. B. Walker, Bennington, Vt., manufacture of brooms.

Wm. Anderson, Ulysses, N. Y., harrows.

Thomas Daugherty, Erie, Pa., lasting instruments.

C. K. Farr, Auburn, Miss., cultivator.

Robert Grant, New-York, hydraulic-press.

J. S. Hall, Manchester, Pa., ploughs.

Abr'm Jackson, New-York, horse-power hoisting machinery.

H. N. Black, Philadelphia, cleaning and drying grain.

M. H. Mansfield, Ashland, Ohio, screens for hulling clover-seed and cleaning grain.

D. W. Shanes, Hamden, Conn., cultivator.

J. W. Sikes, Plymouth, N. C., cap or withe for masts.

J. W. Whittal and W. W. Pendleton, Greenwich, Conn., felt-hats.

D. F. Mellen, Wentworth, N. H., planing metals.